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THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—14TH YEAR. SYDNEY: SATURDAY, SEPTEMBER 24, 1927. No. 13.

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Table of Contents

INFLAMMATIONS OF THE COLON.[1]

By FRANK S. HONE, B.A., M.B., B.S.,

Honorary Physician, Adelaide Hospital, Lecturer in Clinical Medicine and in Preventive Medicine, Adelaide University.

EVEN though nothing new is said in the introductory paper, a discussion on the inflammatory affections of the colon may serve a useful purpose, both in attempting to standardize our nomenclature and in revealing the results of different methods of treatment both medical and surgical.

I do not know that there had been any systematic attempt to classify different affections of the colon until the appearance in 1897 of Hale-White's article on diseases of the colon in the first edition of Allbutt's "System of Medicine."(1) Dysentery had of course been known and described from ancient times; any condition in which blood and mucus were found in the motion was called dysentery, but beyond that there was no attempt at classification. Hale-White made rather an elaborate division of these inflammatory affections into simple, membranous and ulcerative colitis, in addition to what he called follicular ulceration. During the thirty years that have since elapsed there has been a good deal of confusion in nomenclature both in text books and amongst those of us who are in practice. For instance what Hale-White called "dyspeptic membranous colitis," Muir, in his "Text Book on Pathology" and Osler in his "System of Medicine" call "mucous colitis." On the other hand the condition of a patient who was seen by me recently in consultation was described by the medical attendant as a case of mucous colitis, although I would have called it chronic bacillary dysentery and others would have termed it ulcerative colitis.

To make the discussion more practical I confine myself to conditions which we commonly see in our own State. For this reason and also because the treatment is now well established I make only a passing reference to amœbic dysentery. Such patients with this disease whom we occasionally see here nearly all come from abroad or give a history of residence on the Western Australian goldfields. In my own personal experience I have seen only one exception to this.

Two years ago a man died of pericarditis in my ward twenty-four hours after his admission. *Post mortem* this was found to have been caused by direct extension through the diaphragm from a typical solitary abscess of the liver from which living amœbæ were recovered. Traces of ulceration in the caecum were seen, but the closest inquiries of his relatives failed to reveal any history of residence outside South Australia.

I should be interested to hear in to-night's discussion of any other member's personal experience of such exceptional cases.

I saw one supposed exception last year in which recurrent attacks of pyrexia and abdominal pain had led a practitioner interested in tropical diseases to a diagnosis of amœbic dysentery because he found amœbæ in the stools. Subsequent events showed the patient to be undoubtedly suffering from Hodgkin's disease from which he died. Evidently the retroperitoneal glands alone had been involved for months and the organism discovered was not the true *Entamœba histolytica*.

The colon like other mucous membranes becomes inflamed through the action of irritants which may be derived from external sources or may be conveyed to its walls by the blood stream. Unlike the bronchial or genital mucous membrane external irritants cannot reach it directly, but only after their passage through the stomach and small intestine. I know of no ascending infection from below.

Some authorities speak of colitis being set up by the irritation of improper food on the ground that mechanical irritants could cause colitis. If we could recognize a catarrhal colitis such causation might be possible, but although it is described it is very doubtful to my mind whether such a condition exists clinically. If there is a mechanical irritation to the walls of the colon, its effects pass off as soon as the irritant is removed. The best instance of this is the well known effect of hard scybalous masses in the rectum in old people and the immediate cessation of symptoms with their removal.

It is probable that mechanical irritation sets up enteritis with its characteristic symptom diarrhœa, but does not cause true colitis. Much that was once set down to mechanical action is now ascribed to toxic or chemical action. It has also become evident of recent years that in many cases which were formerly placed in this class the symptoms were really due to achlorhydria and once the condition is diagnosed the patients are cured by the regular administration of large doses of dilute hydrochloric acid. Instances could be given to prove this.

At this point should perhaps be mentioned those cases of diverticulitis on which a good deal has been written of recent years. The surgeons who take part in the discussion may have more to say about this condition as its treatment is mainly surgical. I remember seeing only one case (which in the old days would have been called *pericolitis sinistra*).

An elderly woman developed pain low down in the left side of the abdomen and a palpable mass with fixity of the colon raised the question of a neoplasm of the bowel being present, but a persistent pyrexia pointed to an inflammatory condition and the discharge of a large quantity of pus *per rectum* cleared up the condition.

But when I read that 615 cases of diverticulitis have been recognized at the Mayo Clinic of recent years(2) and especially since X ray examination became common I am forced to conclude either that many of these cases were diagnosed entirely on X ray appearances without any clinical manifestations or that we miss many cases.

We are left then with bacteria and toxins as possible causes of colitis. Bacteria are likely to be destroyed during their passage through the stomach

[1] Read at a meeting of the South Australian Branch of the British Medical Association on July 28, 1927.

and small intestine and before they reach the colon. In addition, the colon seems to possess an immunity to most pathogenic bacteria, as witness the comparatively few cases of tuberculosis of the colon in comparison with the total number of patients with pulmonary tuberculosis who swallow tubercle bacilli. Even in bacillary dysentery it is considered that the lesions of the mucous membrane of the colon are not the direct result of bacillary action, but that toxins are produced from the bacilli which, being absorbed, are eliminated by the large intestine with resulting coagulation necrosis of the mucous membrane.[3]

In this connexion it must be remembered that mercury and the other heavy metals when taken by the mouth are excreted by the large intestine and that the bowel symptoms which sometimes follow the administration of iron and arsenic are due to this. In mercuric chloride poisoning in particular a diphtheritic form of colitis is described.[4]

It must never be forgotten also that in old people dysenteric symptoms with the passage of blood and sloughs may suddenly occur as the symptoms of a hitherto unsuspected uræmia. Apparently this is due to the same excretory action of the colon. Consequently in middle-aged persons with symptoms suggestive of colitis examination of the urine should be one of the first requirements. In female infants also in whom pyrexia developes from *Bacillus coli communis* infection of the urinary tract I have occasionally noticed that the initial symptoms may be chiefly those of colitis and that the urinary condition could very easily be overlooked. I remember a striking instance of this in an infant five weeks old.

These two points therefore should be borne in mind before a diagnosis of colitis is made in any case in the extremely old or young.

It is usual for three forms of colitis to be described, mucous, membranous and ulcerative. I have never been able to see the reason for the term mucous colitis. The inflammation or even the irritation of any mucous membrane is accompanied by an extra production of mucus. We never talk of mucous rhinitis or bronchitis or urethritis, why then should we speak of mucous colitis? By suggesting that the presence of mucus implies a diseased condition of the colon the term has a bad mental effect since quite healthy people can find mucus in their motions.

Muir, as I said, uses this term for that affection which Hale-White calls "membranous colitis," meaning those cases of neurasthenic dyspeptic women who with a good deal of abdominal and mental pain deliver what appear to be casts of their bowel wall. Hale-White's original description of these cases can hardly be improved upon.

I remember, just after that article first appeared, having a patient of middle age exhausted with child bearing and family cares, who presented all the symptoms usually described. For some months she tried my patience as well as my powers of treatment until with the improvement in her general health the symptoms disappeared. I have seen her only recently again, a woman nearing seventy years of age, who has never had a return of her symptoms.

Since seeing this first case several others of varying severity have come under my notice from time to time.

It is now recognized that the apparent membrane is not such and that the disease is neither membranous nor is it a colitis, but that it is largely a neurosis. Hurst likens it to asthma in the bronchial mucosa and Edgecombe says it should be called *colica mucosa* or colonic mucorrhœa. If it is not an inflammation it hardly comes within the area of our discussion. If it must still be called a colitis it would be better in order to save confusion to agree on some such name as muco-membranous colitis, remembering always that it is not inflammatory in origin and that there is no condition in which more harm can be done by directing attention and treatment to the local condition rather than to the patient herself.

The symptoms and signs of a true colitis are always the same, namely frequent scanty stools of a muco-purulent or muco-sanguinolent nature with abdominal pains and tenesmus. The degree of fever varies with the acuteness and severity of the attack and the old rule still holds good that the nearer the inflammatory process is to the rectum, the greater the tenesmus, the nearer to the caecum, the greater the colicky pains and that the same holds true with regard to the presence and quantity of blood.

The acute cases of this affection which in this State occur chiefly in children and in the summer are undoubtedly bacillary dysentery. Dr. Beare's investigations in 1921 to 1922 proved that the cases in Adelaide are due to Flexner's bacillus and I will leave him to deal with the acute cases.[5] I shall add only that Flexner's bacillus was demonstrated in these cases, also in Port Pirie last summer and that in my own experience Flexner's bacillus has been recovered if the stools have been examined in the first day or hours of an acute infection in a child even where no blood-stained motions have been observed.

My task is rather to discuss the more chronic forms of colitis. It is recognized by all that acute bacillary dysentery occasionally becomes chronic and is then termed chronic bacillary dysentery.

On the other hand isolated cases of illness are frequently observed in which there has been no acute onset and no known relation to other cases of bacillary dysentery; the patient who is generally an adult, for weeks and months at a time passes with more or less pain and tenesmus from five to eight motions a day containing blood and pus, the amount of which varies in different cases and in the same case at different periods. There may or may not be pyrexia with a varying amount of toxæmia.

It is customary to style these cases ulcerative colitis and for thirty years at least controversy has gone on as to whether this is a different disease from chronic bacillary dysentery. Hale-White in 1897 argued strongly in favour of a different origin and he repeated these arguments in the second edition in 1907 in spite of the contrary opinion of Rolleston and others. Much of his argument goes by the

board to-day since we know that bacillary dysentery is not merely a tropical disease and that Flexner's bacillus has been found in acute cases in every capital city in Australia. We know that sporadic cases of dysentery occur and that mild cases occur, we know that even in known cases of bacillary dysentery the bacillus is rarely recovered after the first week and that agglutination tests are often failures.

On the other hand, apart from the recognized dysenteries due to the Shiga strain, the Flexner group and others of the *Bacillus dysenteriæ* family Morgan has described certain dysenteric cases as due to the Morgan number 1 bacillus.

In a discussion on ulcerative colitis introduced by Hurst at the Section of Medicine of the Royal Society of Medicine in November last year Professor Dudgeon summed up the position and was reported as follows:

> There were three forms of ulcerative colitis with which they were now concerned, (1) due to *Entamœba histolytica;* (2) due to *Bacillus shiga* and *Bacillus flexner;* (3) one in which no causative organism had been found. This was the particular group now under discussion. These patients had not been abroad. In spite of the sigmoidoscope, which afforded such a valuable view of the colon and of any ulceration which might be present within the area of the instrument he had not been able to cultivate a true dysentery bacillus from scrapings of the floor of the ulcers, although in some cases *Entamœba histolytica* had been found when absent from the fæces in spite of numerous examinations.
>
> The only microbes which he (Professor Dudgeon) had found and which appeared to be related to the intestinal ulceration were hæmolytic strains of *Bacillus coli* and *Bacillus mucus capsulatus.* In two cases of ulcerative colitis he had isolated a strain of a hæmolytic colon bacillus from the fæces on repeated examination and considerable improvement in the condition followed the use of an autogenous vaccine, although all previous treatment had failed.

There are thus three schools:

(1) Those who maintain that cases called ulcerative colitis are really sporadic dysentery in which secondary infection by various organisms has occurred.

(2) Those who maintain that it is not a specific disease but that numerous organisms may cause the disease, for example *Bacillus morgan* 1, *Bacillus coli* and streptococci and even pneumococci according to Lochhart-Mummery.

(3) Others who maintain that it is a specific disease apart from bacillary dysentery. From time to time observers who hold this view have isolated what they believe to be the cause but their results have not been confirmed.

In two papers in 1924 and 1925 A. J. Bargen, of the Mayo Clinic, reported that he had discovered a Gram-positive diplococcus in 80% of cases of ulcerative colitis, that it had been obtained in pure culture from early lesions and that by intravenous injection lesions like those in human beings had been produced in rabbits. In the discussion at the Royal Society of Medicine above mentioned Hurst stated that Houston, of Belfast, had recently isolated a similar organism but was as yet unconvinced that this was the specific organism of ulcerative colitis. He was quite definite that there was nothing in appearances as seen by the sigmoidoscope by which these sporadic cases called ulcerative colitis could be distinguished from chronic bacillary dysentery.

I first became interested in this question owing to a personal experience of an epidemic of colitis in a country district in 1900 and 1901 which was reported at the time.[7] In subsequent years at the Semaphore we experienced similar outbreaks almost every summer. These would now undoubtedly be classed as bacillary dysentery. I remember particularly the first case of that first epidemic which dragged its course for several weeks. Seen to-day as an isolated case it would be called ulcerative colitis, yet it was the direct cause through the agency of flies of two other acute cases which to-day would be termed bacillary dysentery. Without burdening this paper with records of individual cases I shall simply say that as years have gone by and I have seen various isolated cases I have become more and more conscious of the difficulty in my own mind of regarding the two as separate conditions. For the resemblance extends even to treatment and to the tendency to relapse.

This is well illustrated by the recent paper by Manson-Bahr and Gregg on the surgical treatment of chronic bacillary dysentery.[8] For their description of pathology, sigmoidoscopic appearances, medical treatment and surgical treatment by appendicostomy or ileostomy corresponds exactly to that given under these heads in articles on ulcerative colitis.

At present I know of no clinical or laboratory method by which one can separate the two conditions. This becomes of extreme importance in regard to the prevention of acute bacillary dysentery. For it is through the unrecognized cases in which the patients also become carriers that the acute disease is spread and if these cases called ulcerative colitis are really sporadic cases of bacillary dysentery with an insidious onset we have a very fruitful source of infection in our midst. At present we can only say that we are still seeking further truth in this matter and that it behoves each of us to observe closely every case we see and later assemble the result of our observation. As a safeguard, however, it is I think advisable to regard every patient with so-called ulcerative colitis as a potential carrier of dysentery and teach our patients to take precautions accordingly.

Diagnosis.

Apart from the controversy whether a case is ulcerative colitis or bacillary dysentery, diagnosis is generally easy. The most common difficulty in a sporadic case is in reference to intestinal tuberculosis. In the last year, for instance, I have seen two cases in which this difficulty was experienced, both, curiously enough, when the abdomen was opened. I think medical men are often too apt to think of tuberculosis as the cause of an otherwise unexplained chronic diarrhœa. For this reason it

seems advisable to dwell on this point. Tuberculosis of the large bowel occurs in two forms, the hyperplastic, chiefly involving the caecum and the ordinary tuberculous ulceration. The first appendix I ever removed was in a young girl, aged fifteen years, from Broken Hill, with pyrexia, right sided pain and a palpable mass in whom we expected to find an appendix abscess, but who subsequent to the removal of the appendix ran a course of caecal hyperplastic tuberculosis which terminated in death. These patients, however, in my experience suffer from constipation rather than diarrhœa and remembrance of this fact helps the diagnosis from the condition we are considering.

Tuberculous colitis with diarrhœa is in my experience invariably secondary to pulmonary tuberculosis, the signs of which can be found on examination of the lungs. Mummery says he has never seen a case of primary tuberculosis of the colon.

Tertiary syphilis of the large bowel is unusual but should present no difficulties in diagnosis.

In apyrexial cases cancer of the colon may present difficulty. Hurst has emphasized the value of routine sigmoidoscopic examination in all doubtful cases and says that if there is no ulceration in the lower thirty centimetres (twelve inches) of the pelvic colon ulcerative colitis or dysentery may be excluded and the symptoms are almost certainly due to a growth in the colon.

Certainly we have not hitherto utilized the sigmoidoscope sufficiently in the medical wards in our investigations of these doubtful cases of colitis and recent literature emphasizes the value of this method of examination.

Treatment.

For both ulcerative colitis and chronic bacillary dysentery the treatment recommended by the different authorities seems to be the same. Rest in bed of course is essential and wherever possible this should I think be in the open air and in the sun.

There is not the same necessity for so rigid a diet as in acute dysentery. From the lengthy nature of the case the patient's strength needs to be sustained and food should be nourishing and given frequently. Milk is well borne, but I have found in certain cases that eggs aggravate symptoms. This is supported by the experience of a patient who after an attack of dysentery in Western Australia had a very pronounced anaphylaxis for eggs. Although food should be abundant and varied it is of course best to avoid food with too solid a residue and when at a later date vegetables and fruit are given they should be strained through a sieve. I have been struck with the fact that after healing is begun and the patient's condition is improving an over irritable condition of the bowel remains which causes an increase of diarrhœa with any sudden emotion or increase in exertion as well as alteration in food. This entails the closest care in introducing changes. As in all chronic cases of illness, one change should be made at a time so as to observe the effect. It is at this stage and this stage only that bismuth preparations are useful.

Irrigation of the bowel is advised for both affections. Silver salts used to be strongly advocated but of late potassium permanganate irrigation has been more favoured. I confess that for years I have abandoned this method of treatment. It seems to me to worry the patient more than is justified by the good it does. Others who have used it more recently may have more to say about it.

It has appeared to me for some time that if irrigation is needed the same result is really achieved by the judicious use of salines given by the mouth. Although sodium sulphate is generally recommended I have found magnesium sulphate equally effective. However we believe it to act, whether by osmosis or or by excretion through the bowel wall, there is no doubt it keeps the mucous membrane bathed in a saline solution more continuously than interrupted irrigation from below. The mistake generally made I think is insufficient dosage. One of the cases in which the true physician can best display his art is, I believe, the proper use in these cases of large doses of saline with the appropriate dose of opium or morphine to quieten peristalsis. Sometimes when I have suggested this I have learnt subsequently that the dose was given once or twice a day, but as in all cases where continuous action is desired, frequent divided doses are essential.

In the last few years Hurst has strongly advocated the use of large doses of polyvalent antidysenteric serum given intravenously. He urges this whether the condition is called ulcerative colitis or chronic bacillary dysentery and claims to get the same results in both. This is interesting as bearing on the question of causation. Other observers have not had such dramatic results as he claims but in the discussion above quoted several spoke favourably of the method.

Hurst recommends an initial dose intravenously of forty cubic centimetres followed on successive days by sixty and eighty cubic centimetres and then by one hundred cubic centimetres for four or five days. He mentions the occurrence of rashes and sometimes of alarming symptoms which, however, pass off. One difficulty is to know how long this treatment should be continued. It will be noted that in each of our cases definite improvement occurred after the third injection and that in each case we repeated the course after a week's interval. In one case alarming symptoms occurred, in the other nothing untoward happened, but the patient objected to the pain. The full dose is rather a big injection and should be given slowly.

Hurst says it is not an example of protein shock therapy, as he does not get the same results with horse serum. The lessening of toxæmia is just as pronounced as the lessening of diarrhœa and both these facts seem in favour of bacillary causation.

I leave others to discuss the surgical methods of treatment.

Whatever the treatment, the condition is tedious and serious. The mortality of ulcerative colitis used to be put down at 50%. Lochhart-Mummery says that by improved methods of treatment it has been reduced of recent years to 20%.

Convalescence in those who recover is slow. I have been particularly struck with the mild tachycardia which remains for a long time, apparently due to myocardial weakness. This with the irritability of the colon previously referred to necessitates careful oversight for a lengthy period.

During the present year we have had the opportunity of treating two patients by the intravenous injection of large doses of antidysenteric serum; full notes of these are subjoined. The results are sufficiently encouraging to justify further trial, though not so dramatic as Hurst's description or as in the more chronic case which I hope Dr. Jose will report. They illustrate the different aspects of the problem which I have mentioned. The first gave a history of previous attacks of dysentery yet the sigmoidoscopic diagnosis was ulcerative colitis, the operative diagnosis was intestinal tuberculosis. Caecostomy caused some improvement, the intravenous injections caused still further improvement and now when he is convalescing he has developed an arthritis which may be taken as evidence of a dysenteric infection.

The second patient's condition was an isolated case from the West Coast with a gradual onset like ulcerative colitis. It occurred at a season when we see bacillary dysentery, though no other known case can be traced in his district. Irrigation, as in the previous case, did no good, intravenous medication led to a rapid improvement which, however, was not fully sustained; a second series of injections caused still further improvement, but supplementary measures were needed. He also had a thrombotic complication which favours the idea of a dysenteric infection.

Clinical Histories.

CASE I.—E. G., *ætatis* twenty-four years, a packer living at Norwood, was admitted to the Adelaide Hospital on February 9, 1927, complaining of diarrhœa with passage of blood and mucus for the previous two weeks. His history showed that he had dysentery in Colombo two years previously. This attack lasted four weeks; he had a recurrence for a few days about a year later in England and a slight touch in this State six months previous to admission. He then remained well until two weeks before admission when, following on an attack of constipation, he started passing mucus and blood two or three times a day, sometimes without fæces. Motions when passed were well formed and sometimes without any blood and mucus. He had felt well and had remained on ordinary diet with the exception of fruit and the last few days had become worse, passing eight to ten motions daily with blood every time. On admission his temperature was only slightly elevated (37·3° C. or 99·2° F.), his pulse rate was 92, the tongue was covered with a dirty brown fur. Other physical examination revealed no abnormality. Motions were chocolate coloured, liquid fæces with blood and mucus.

For the next few days he continued to pass four motions in twenty-four hours containing blood and mucus and sloughs, his temperature ranged between 36·9° C. (98·4° F.) and 37·8° C. (100° F.). Microscopical examination always revealed blood and pus cells, but no amœbæ or *bacilli dysenteriæ* were found. He was treated with sulphate of magnesium and opium; after a week his temperature ranged higher and both ascending and descending colon were palpable, thickened and tender. On February 23, when his temperature had fallen to normal, a sigmoidoscopic examination was made and under a general anæsthetic the surgeon reported a very inflamed mucosa with numerous small ulcers. He looked upon it as a case of ulcerative colitis and recommended daily washing out of the large bowel with a one in a thousand solution of silver nitrate.

During the next week his condition remained much the same. Following on the introduction of eggs to his diet his temperature rose again and motions increased to six or eight daily. During the first week in March, following on increased dose of magnesium sulphate the motions became more natural in appearance with only occasional specks of blood and his temperature fell, but he was losing weight, had become very thin, the colon was still palpable and tender and in an endeavour to hasten matters an appendicostomy was advised. On account of his condition this was attempted under a local anæsthetic, but following on an unsuccessful attempt to deliver the caecum with the wound a general anæsthetic was given. The appendix was found to be acutely inflamed, there was thickening of ileum and of caecal walls with numerous adhesions about the caecal angle and calcareous glands also. The condition was thought to be highly suggestive of a tuberculous process, although no definite tubercles could be seen and there had never been any tubercle bacilli detected in the fæces. As a satisfactory appendicostomy was impossible, the appendix was removed but not invaginated and the wound closed in layers. In the next few days there was a good deal of inflammatory reaction with subsequent breaking down of wound and discharge of fæces so that practically a caecostomy resulted. The appendix on examination showed no evidence of tuberculosis and fæces still yielded no tubercle bacilli.

Until the end of March his temperature was only slightly elevated, his general condition improved, but in spite of the constant discharge from the wound he still had three to five liquid motions *per rectum*. In the meantime the resemblance to conditions described in Manson-Bahr's article had been recognized. On this account it was decided to try the treatment with large doses of antidysenteric serum intravenously, as recommended by Hurst, and he was returned to the medical ward. He was put on to a much fuller diet and Hurst's directions were strictly followed except that on account of his condition only twenty cubic centimetres were given at the first injection. After nine injections they were discontinued. Although there was no appreciable effect on his temperature and the discharge from the wound naturally remained the same, there was a definite improvement in the rectal discharge from the first week and in his general condition. This continued for a fortnight with practically a normal temperature when there was a sharp rise again to over 37·8° C. (100° F.) and a rise in pulse rate, but no alteration in fæcal discharge from the rectum. A fresh series of injections was tried with no untoward result, but after three the patient refused more on account of the pain. His temperature, however, had settled to normal. During May he steadily improved and more and more fæces passed by the anus which were normal in appearance except for undue fluidity. For this reason he was put on a bismuth mixture at the beginning of June with immediate results as regards the frequency and consistence of motions.

For the past month he has been getting about the ward and has put on condition. There has been only a slight escape of fæces by the wound and the only question has been whether to close it completely. A recent rectal examination revealed no ulceration. Notwithstanding this he has during the last three days developed a recurrence of pyrexia with arthritis.

CASE II.—D. O., *ætatis* twenty-three years, living on the West Coast, had always been perfectly well until February this year. On February 23 he first noticed looseness of the bowels of about four motions a day but no feverishness. He kept about and the looseness gradually became worse until March 3 when he had violent abdominal pain and the motions increased to about eight a day, mostly "curdled blood." On March 9 he went down to Elliston and saw Dr. Rieger. He was put into the Elliston Hospital for a fortnight on an exclusive milk diet. The looseness of the bowels continued with the same character of motions and high temperature. After a fortnight in hospital, as there

was no improvement he was advised to come to Adelaide to see Dr. Newland with a suggestion for an appendicostomy. He entered the North Adelaide Hospital on March 24. His motions were very frequent and offensive and his temperature ranged between 37·8° and 39·3° C. (100° and 102° F.) with a pulse of 90 to 100. There was frequent abdominal pain with the motions and a fair amount of tenesmus. Dr. Newland considered that it was not a case for appendicostomy and treatment with irrigation of the bowel was tried and salines by the mouth at first and later bismuth preparations. Microscopical examination of fæces at this time and subsequently revealed neither amœbæ nor dysentery bacilli.

On April 13, following on a previous case in the Adelaide Hospital, Dr. Newland kindly handed this case over to me to try intravenous injections of polyvalent antidysenteric serum. These injections were started on April 14. Hurst's plan was strictly followed and after the full dose had been reached a hundred cubic centimetres were injected daily for four days. He complained of passing discomfort in the chest during each injection. On April 21 this became severe and a certain amount of cyanosis appeared so that the injection was interrupted when half complete. His motions had dropped to three daily after the third injection and their character had greatly improved. His temperature also fell and by April 23 was normal and his general condition was greatly improved except that a serum rash had appeared on April 22 which gave him some discomfort. On April 25 his temperature began to rise again, although the motions had not increased in frequency. It steadily mounted for the next three days until it was 38·9° C. (102° F.) and a fresh series of injections was tried on May 1, starting off on one cubic centimetre to guard against anaphylaxis and increasing to thirty and then to fifty cubic centimetres. On the last occasion he became so distressed with substernal pain, cyanosis and rapidity and failure of pulse that the injections were discontinued. His temperature fell slightly but did not regain normal line. Dr. Newland saw him with me on May 11 and was struck with the improvement. On the following day, however, his temperature went up to 38·9° C. (102° F.). He complained of pain in the leg and developed a thrombosis in his left saphena vein. This threw his circulation completely out of gear, so that his pulse went up to 156, and when Dr. de Crespigny saw him with me on May 12 he looked a very sick man, more from his cardiovascular complications than from his bowel symptoms. The next week he was desperately ill, and attention was centred on his heart condition. His pulse gradually improved, his temperature also fell slightly. During this time his motions had not increased in frequency, the blood had not returned, but there were still sloughs and mucus. He was therefore put on a mixture containing large doses of magnesium sulphate with *liquor morphinæ hydrochloridi* with considerable improvement to the character of the motions. After this medicine was left off certain indiscretions in diet caused an increase in the frequency of his motions which were corrected with bismuth and chalk mixture. His diet was gradually increased and some four weeks after his thrombosis he was allowed to move his leg and sit up. His nervous system had throughout been unstable and with each increase of movement a slight return of diarrhœa ensued. He was finally able to leave the hospital on June 26 and has steadily regained strength, although his left leg is somewhat swollen and his pulse becomes rapid on exertion. He now has two full motions in the forenoon which are perfectly normal in appearance. Rectal examination last week revealed nothing abnormal.

I was anxious to show him at this meeting but he was so well that he insisted on returning to the West Coast last week.

References.

(1) Thomas Clifford Allbutt: "System of Medicine," First Edition, Volume VIII.

(2) *Annals of Surgery*, September, 1924.

(3) E. R. Stitt: "Diagnosis and Treatment of Tropical Diseases," page 136.

(4) Macallum: "Pathology," page 404.

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THE MEDICAL TREATMENT OF GALL BLADDER DISEASE.[1]

By ALLAN S. WALKER, M.D., Ch.M. (Syd.),

Honorary Assistant Physician, Royal Prince Alfred Hospital; Honorary Consulting Physician, Saint George District Hospital.

IT is becoming increasingly more important for the physician to recognize affections of the gall bladder, particularly in their early stages. We of course recognize that in using the term "gall bladder disease" we admit the frequency of the involvement of the whole biliary tract in the process. In cholecystitis, for instance, we have an inflammation which may spread even to the liver cells themselves and to the pancreas.

Careful studies have shown that almost half the cases of indigestion due to abdominal disease are caused by gall bladder inflammation. The most typical patient is he who complains of an irregular flatulent dyspepsia, that is, his most prominent symptom is a feeling of fullness or weight in the epigastrium which he often describes as "wind."

Other diagnostic points in gall bladder disease are the history of colic which may be quite brief or prolonged or of definite epigastric pain, deep or surface tenderness over the area regarded as the skin projection of the gall bladder and evidence of the presence of bile pigment in the body tissues and fluids. To these must be added the special X ray methods, certain of the bio-chemical liver tests, especially the Van den Bergh and confirmation with the duodenal tube.

The physician must also remember the possibilities of the gall bladder as a toxic or septic focus. What of the patients with rheumatoid arthritis who have absence of hydrochloric acid in the stomach? What of those who have what they call "heart attacks" brought on by "wind" and who present signs of myocardial degeneration not readily otherwise explained? What of the relatively young subject of hyperpiesia with epigastric discomfort after meals?

Certain organisms cultured from bile have been found to have an affinity for the gall bladder in animal experiments. Here then is a possible vicious circle: gall bladder, bowel, liver, gall bladder. Moreover it is possible that the detoxicating function of the liver may thus be impaired, a factor worth remembering in any disease considered to be due to focal sepsis.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on August 25, 1927.

I do not suggest a gall bladder obsession, but point out that in considering the possibility of an abdominal lesion disease of this viscus is much more common than either peptic ulcer or chronic appendicitis.

Now what patients are we to treat by purely medical means? I suggest the following groups:

Those patients with catarrhal jaundice; this group hardly concerns us to-night.

Those requiring treatment preparatory to surgery; for instance a patient with gall stones who is deeply jaundiced.

Those suffering from gall stones either in the interval period or with exacerbation of inflammation where operation is deferred or refused.

Those showing indications of an early cholecystitis, including the people who have vague dyspeptic and other symptoms possibly consistent with either early inflammatory gall bladder or cirrhotic liver changes.

Those with diseases such as arthritis suspected to be due to septic focus, where other sources are excluded and symptoms too indefinite to warrant surgery point to the gall bladder.

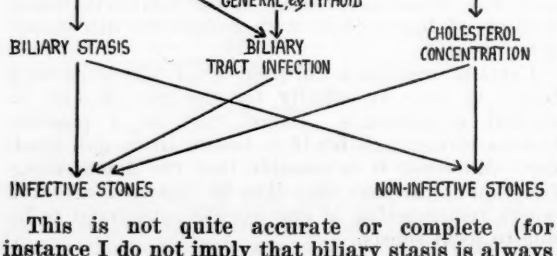
Those with chronic cholecystitis who will not or cannot have the correct surgical treatment, for example the elderly patient with a seriously damaged cardiac muscle who is regarded as a bad subject for surgical operation. It is admitted that many of these come under the category of those who refuse operation.

Those who have had cholecystectomy performed and who still have symptoms of biliary tract disturbance, for example recurrent cholangitis or the passing of bile sand.

Treatment and Ætiology.

Successful treatment is based upon ætiology. Are we not in the habit of thinking "cholecystitis" or "gall stones" as the case may be and from the mental pigeon hole bearing that label producing the dossier of jumbled therapeutic suggestions?

In the accompanying diagram I suggest roughly the possible paths of disease, starting from anomalies of diathesis and initial general infections and reaching through various permutations the end result of gall tract stones or infection.



This is not quite accurate or complete (for instance I do not imply that biliary stasis is always preceded by or due to hypoacidity) but we may take the captions in order as indications for treatment. Thus every item in treatment is inspired by a definite effort to combat the cause of the disease.

Gastric Acidity.

Gastric acidity may be in excess of the normal but hydrochloric acid may be absent. The fractional test meal gives definite help here. Without it the indications are largely empirical.

Achlorhydria allows infection to spread more easily to the bile passages and also leads to biliary stasis. Dilute hydrochloric acid given with a meal effects definite improvement when the free acid is low.

Other Infections.

Focal sepsis is worth more than a passing thought. Septic teeth or tonsils and an anacid stomach are a combination fraught with potentialities for harm.

The Hypercholesterolæmic Diathesis.

There is no unanimity as to the exact value of the blood-cholesterol estimation or even as to the average finding in gall bladder disease. The difference of opinion may be due to the variations in the type of patient examined. We might expect the patient with the so-called "metabolic" stones to have a high blood-cholesterol, that is near or over 2%; but with the sufferer from infection and with stones which can be formed without an increase of cholesterol in the blood the case is different.

Possibly the chief value of this analysis is that thereby the patient with a metabolic fault may be selected. In such a case it is rational to eliminate from the diet such foods as egg yolk, brains, sweetbread, liver and kidney and to restrict all fats. Indeed the general limitation of fatty foods in the dietary of the patient with gall bladder disease is always wise. Diet must also be considered under the next heading.

Biliary Stasis and Obstruction.

In regard to biliary stasis and obstruction there are certain general points for attention. Regular intestinal movement is vital; regular meals and sufficient exercise are equally important and the obese patient should lose some weight.

The treatment directed more especially to the sluggish biliary flow includes dieting, drugs and non-surgical drainage. The diet should be sapid and sufficiently stimulating to encourage a digestion that is not seldom asthenic. Low fats are advisable. Protein is often limited but it certainly should be adequate in amount, its proportion to carbohydrate depending on the type and weight of the patient. Special considerations induced by knowledge of the stomach chemistry or the pancreatic function may also govern the ordering of a diet.

The old dictum that a meal is the best cholagogue is valuable. I have personal faith in a light supper for these patients, given with the idea of promoting biliary flow for a time at least during the night hours.

Drugs are few. Alkalis seem to relieve symptoms. Possibly they are more of use in the hyperacid patients, but if it is desired to give them, even

achlorhydria is not a contraindication, as they may be given at a suitable interval after the acidified meal. Salicylates on clinical grounds at least also appear to give relief to some patients. Olive oil may help those with hyperacid stomachs. It also helps the reputation of the too numerous charlatans whose "cured" patients tell with eager if temporary rapture of the saponified oleic acid "gall stones" they have passed.

Sulphate of soda and magnesia have long been our mainstay and with reason. Observations with the duodenal tube have given them experimental warrant, for their presence in the doudenum is followed by the arrival of the gall bladder contents through the duct sphincter. Probably the benefits accruing to patients with cardiac failure, big and tender of liver and icteric of skin, who are given Epsom salts, are due in part to this action. These salts may be administered hot in strong solution, preferably fasting. In this way a moderate degree of biliary drainage can be obtained, unless, of course, actual firm obstruction exists. A much more positive method of attaining the same end is that of non-surgical drainage by the duodenal tube. It is claimed that the amount of bile thus recovered is thrice that obtained by surgical drainage. But it may be asked, why trouble to introduce simple drugs through a tube when they may be given by the obvious procedure of swallowing? The advantages are (i) the greater certainty, (ii) the opportunity for accurate diagnosis thus given and (iii) the avoidance of a vicious circle. Taking the latter point first, in cases of bacterial infection of the bile ducts and bladder the toxins and products of infection absorbed from the bile in the intestine may return, as Lyon points out, through the body tissues and organs *viâ* the liver once more to the gall bladder. The complete elimination of the infected material may break this spell and give the poisoned organ a chance of restitution.

To establish diagnosis the tube is passed into the stomach which is washed out and then on into the duodenum which is also washed. Then four to sixteen grammes (one to four drachms) of magnesium sulphate in 25% solution are introduced and the bile withdrawn by subsequent aspiration. Lyon stresses the importance of certain diagnostic fractions; their value is doubtful. But cultures may be made and examination for cells carried out with great advantage. The verification of the exact position of the bulbous tip of the tube by the fluorescent screen has been recommended; it seems hardly practicable.

Drainage by the tube has a real place in treatment; its possibilities should be borne in mind. Such drainage may be intermittent, carried out for periods of four to eight hours once or twice a week or continuous for a day or more at a time. An essential feature is the introduction of the salts solution into the duodenum which may be done once or twice a day. Very jaundiced or obviously infected patients for whom surgery is not contemplated at once or at all for various reasons might well be treated thus. We feel that something should be done for them.

Infection.

Under the head of infection comes much that has already been said. Surely drainage in some form is indicated.

The exhibition of hexamin is valuable treatment; it helps to reduce the bacterial contamination of the bile. The best method of administration is that sponsored by Hurst; large doses, even up to six grammes (one hundred grains) can be given, the patient taking enough bicarbonate of soda to keep the urine slightly alkaline, thus preventing the liberation of irritating formaldehyde in the urinary passages. Even prolonged dosage with 1·2 to 1·8 grammes (twenty to thirty grains) of hexamin thrice daily is well worthy of trial.

Here may be mentioned the occasional cases of recurring cholangitis in patients who have had the gall bladder removed. One such patient troubled me greatly some years ago. The surgeon reopened her abdomen but found nothing requiring further surgical treatment. She returned to worry me, which she did for some time. I now think that duodenal drainage would have greatly hastened her recovery.

Conclusion.

In conclusion I state the most important point of all. To be successful medical treatment must be applied to properly selected patients. It is obvious that serious and permanent damage of the gall bladder, in fact any pathological state crying urgently for the relief that only the surgeon's hand can give, cannot be cured by less radical means. And at the opposite extreme are the early and mild infections. Surely we would not submit all these to operation.

The surgeon should know more of the grosser inflammatory troubles of the gall bladder than the physician; the latter perhaps sees more of the lesser grades of biliary disorder and their very important consequences.

The moral is plain. We have read, heard and talked so much of cooperation and team work that their mention is almost a conditioned reflex. But as yet except in public hospitals or privately at considerable cost and inconvenience thorough investigation of patients suspected of such ailments as those which to-night we discuss is difficult. In fact we must admit it is rare. Some day let us hope the practical application of the moral will be within easy reach.

THE SURGICAL GALL BLADDER.[1]

By Hugh R. G. Poate, M.B., Ch.M. (Sydney), F.R.C.S. (England), F.C.S.A.
Honorary Surgeon, Royal Prince Alfred Hospital; Visiting Surgeon, Prince of Wales Hospital, Sydney.

For many years I have held the opinion that affections of the gall bladder are just as common as those of the appendix and I know of no ailment

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on August 25, 1927.

so frequently overlooked as is cholecystitis in its various forms and none which until recent years has been given such scanty attention by our profession.

On the whole we seem now to be in a transition stage as regards our viewpoint on the subject of cholecystitis and just as in dealing with affections of the appendix we try to forestall any complications so are we learning to deal with the diseased gall bladder. The cause of this faulty understanding lies in the prominence given to the sequelæ of gall bladder disease in our textbooks, so that as students we get the idea that gall stone formation and its complications are for all practical purposes the start and finish of gall bladder troubles. Just as is the case of the appendix, when we can recognize the earlier affections of this organ such as appendiceal colic, catarrhal appendicitis, appendiceal dyspepsia, subacute and chronic appendicitis, so should we teach the early recognition of similar conditions with regard to the gall bladder instead of waiting for the onset of cholelithiasis or some acute inflammatory affection before making a diagnosis.

It has been stated that 10% of the bodies of persons dying after the age of twenty years show the presence of gall stones. Except with the solitary cholesterin stone their formation is always preceded by a cholecystitis and as this affection is by no means always followed by cholelithiasis, it seems that a considerable proportion of all adults must have cholecystitis at some period in their lives (Hurst).

Our aim therefore should be to recognize the presence of cholecystitis and to institute treatment before gall stones or other later troubles have time to develope. In many conditions including the one under discussion the terms "dyspepsia" and "gastritis" are often given by our profession as a final diagnosis and accepted as such in all good faith by our patients, when we are really only offering a pretext for our laziness, tendering an excuse for our inefficiency or seeking a cloak for our ignorance.

Symptomatology.

The patient generally refers early symptoms to the stomach, complaining of fullness, weight distension or a feeling of oppression in the epigastrium coming as a rule about half an hour after meals and relieved by belching or by induced vomiting. These sensations are induced particularly by certain articles of diet, especially those containing greasy or acid foodstuffs. There is frequently a sensation of tightness which may even become painful, and we have all heard times without number how the patient has to loosen all clothing in order to gain some relief. Often complaint is made of heartburn and belching may bring bitter or acid regurgitation into the throat or occasionally there is a sudden gush of saliva into the mouth.

At times a deep forced inspiration may induce an acute stabbing pain beneath the right costal margin often of such severity as to check this act of respiration. This pain also is frequently referred through to the back or under the scapula. When the inflammatory changes are moderately active patients may experience slight sensations of chilliness or of shivering especially in the evenings and "gooseflesh" is often mentioned in the list of their disagreeable experiences.

Symptoms such as these may persist for years until a series of acute attacks of colic supervenes or an acute cholecystitis developes and diagnosis becomes self-evident. Patients generally consult their local practitioner for advice concerning these early symptoms and unless the cause of the symptoms is carefully gone into, recognized and efficiently treated, their dyspepsia becomes chronic and other troubles eventuate.

I have been struck particularly with the frequency of some involvement of the pancreas with chronic cholecystitis and consider any definite symptoms of involvement of this organ, such as pain and tenderness running across the epigastrium under the left costal edge accompanied usually by vomiting, to be a definite indication for operative treatment. Acute pancreatitis is fortunately a comparatively rare ailment, but chronic and subacute pancreatitis is almost as common as chronic cholecystitis and in a great number of cases is definitely associated with it.

We all know of the close association there is between gall bladder disease and chronic appendicitis. So frequent is this the case that in operating for gall bladder troubles I always examine the appendix and in operating for chronic appendicitis I always try either to see or feel the gall bladder. In only two cases have I encountered any very acute condition in both these organs and in both cases both organs were gangrenous with the gall bladder condition dominating the clinical picture and it is safe to say that had I not felt for the appendix that both these patients would have died instead of being alive and well to-day.

Another common association with chronic cholecystitis is a chronic myocarditis and it is very important to make a thorough and painstaking examination of the cardio-vascular system before advising operation, particularly in the elderly stout type of patient who has a long history of chronic troubles.

I would like to draw the attention of our physician colleagues to two other types of cases in which chronic cholecystitis may play a big part and should always be definitely excluded. I refer to cases with attacks of *angina pectoris* usually of an atypical character and to cases with intermittent and spasmodic attacks of high blood pressure during which the patient is obviously suffering the effects of an acute auto-intoxication. One such patient I well remember who for a number of years had such attacks recurring with increasing frequency until she was practically an invalid. The blood pressure would rise to 220 to 240 millimetres of mercury and the heart condition was causing alarm. Fortunately the physician who was called in consultation suspected possible gall bladder trouble and his suspicion being confirmed in later attacks he insisted on operative measures with a result that the patient in over three years

has had no further attacks and the blood pressure keeps steady at about 150 millimetres of mercury.

Typhoid fever has been credited with causing a good deal of gall bladder trouble, but for some years I had cultures made from every gall bladder operated on and in only one case was the typhoid bacillus found and that was in a girl of eighteen years of age who had an acute suppurative cholecystitis as the first illness in her life.

Diagnosis.

The advent of the Graham test and X ray demonstration of the gall bladder has given us a very welcome help in diagnosis and from my personal experience in a fairly large number of cases I have nothing but praise of the method, but the radiographer should aim at giving us as much information as possible as to the functional activity of the viscus when it does fill with the dye, for these are generally the cases which puzzle us most. When stones can be demonstrated or when the organ does not fill the X ray examination is generally confirmatory of a positive clinical diagnosis, but when the viscus cannot be demonstrated I think a repeat test should be given before a final diagnosis of pathological gall bladder is made. In those doubtful cases also when the gall bladder fills observation as to its functional activity may yield valuable information. This is exemplified by the case of a patient under treatment at the present time whose gall bladder filled slowly and at the end of thirty-six hours still showed a distinct shadow indicating inefficiency and confirming the clinical diagnosis of simple chronic cholecystitis. Unless the radiographer has an opportunity of correlating his observations with the history and clinical findings he should refrain from making a positive diagnosis and be content merely to state his findings.

While on the subject of diagnosis I should like to draw attention to the Van den Bergh test. It is a generally recognized fact that there is an intimate connexion between the lymphatics of the gall bladder, liver and duodenal areas and it is by no means uncommon to find a certain degree of hepatitis associated with a chronic cholecystitis, the histological appearance being that of a pericholangitis. If this process advances far enough the function of the liver cells is interfered with and the patient may show a definite reaction indicating the presence of bile pigment in the blood, even when no definite jaundice is apparent. In these cases it is usually possible to detect a peculiar sallow colouration of the skin which may vary from day to day and the urine may show a slight ring of colour with nitric acid.

I recently saw a patient who had been the rounds not only of Sydney but most of Europe and who had an extensive overhauling at the Mayo Clinic. It was not until he was subjected to a Van den Bergh test that evidence was forthcoming that there was a distinct pathological lesion and the use of the duodenal tube proved the existence of a chronic infective cholecystitis probably with associated hepatitis and pericholangitis.

Diagnosis of Conditions other than Cholecystitis.

The diagnosis of cholelithiasis may present some difficulty at times and more particularly in the cases of the minute seed calculi when the patient gets very short sharp attacks of acute colic. These may be only momentary and in an otherwise healthy young person be difficult to account for. Not long ago I operated on an active young woman who had been seen by many doctors and who was admitted to hospital with a diagnosis of neurasthenia. She had a gall bladder full of minute calculi no larger than a pin's head and her only symptom was occasional epigastric uneasiness and a series of short sharp colicky pains none of which lasted more than half a minute.

Empyema of the gall bladder is usually a disease of elderly folk and is usually but by no means always associated with gall stones. I would draw particular attention in these cases to the frequency of an abscess developing in the liver substance deep to the gall bladder which if not discovered may lead to a fatal ending.

I have met with an acute perforation at the fundus of the gall bladder in a youngish man without any sign or symptom of other disease of the organ. I thought he had a perforated duodenal ulcer, but Dr. Bye, of the Royal Prince Alfred Hospital, gave a positive diagnosis of ruptured gall bladder and said he had seen several other cases of similar nature at the hospital. The gall bladder had a clear cut perforation at the fundus suggesting an acute ulcer but no cause for it could be found. I have seen one case of complete absence of the gall bladder, the symptoms being a symptomless jaundice in a woman of thirty-five years of age and due to multiple calculi in the common bile duct. I have on three occasions in the last year operated on patients who had a typical history of cholecystitis with a swelling below the right costal margin, suggesting a dilated gall bladder, but which turned out to be a hydatid cyst pushing the gall bladder downwards and inwards. I have seen several cases with hæmorrhage into the gall bladder causing acute symptoms and due to a carcinoma of the viscus and we have all seen carcinoma developing secondary to cholelithiasis or at any rate associated with that condition. So far I have not met with an operable case of carcinoma of the gall bladder. In one case a man of about thirty-eight years had symptoms referable to the gall bladder and at operation a large gumma in the region of the portal fissure and involving the gall bladder was found.

Treatment.

I will not discuss diet and medical treatment, as that will be dealt with by the physician but of this I am sure that cholesterol free diet does help these patients and that salicylate of soda with sodium bicarbonate taken over a long period and possibly alternated with hexamin is of great value.

As regards surgical measures in most cases cholecystectomy is the most suitable operation. If there is much associated pancreatitis and the gall bladder is not too extensively diseased I think it

should be drained for about two weeks. If the gall bladder has to be removed then a small tube inserted direct into the common bile duct and brought out through the right loin is the best way of establishing drainage in these cases or where there is any infection in the common bile duct. After cholecystectomy a tube from the stump of cystic duct is brought through the loin for thirty-six hours or so. If a gall bladder is drained be sure to bring the tube out through the abdominal wall as close to the costal margin as possible and in a direct line forwards from the normal gall bladder position. If it be drained too low trouble will certainly arise due to kinking of the cystic duct. In some cases of old chronic infective cholecystitis or in some cases of empyema of the gall bladder where complete removal of the organ from its bed in the liver substance is impractable or inadvisable, cut away as much of the thickened gall bladder as is possible with scissors, curette the remaining mucous membrane and drain the area so left. Never displace omentum more than is possible when dealing with these cases.

As regards incision I now use only a right paramedian incision and find that with Devine's retractor this gives the ideal exposure. I consider that the use of this retractor and its accessories has shortened my operation time for these cases by fully 25% and strongly advise my *confrères* to make themselves *au fait* with this instrument, as it often converts an otherwise difficult and dangerous operation into a straightforward and simple procedure. In skilled hands and with the use of the rectractor I consider the mortality of gall bladder operations should not be any greater than that of appendicitis.

CHOLECYSTOGRAPHY.[1]

By B. P. ANDERSON STUART, M.B., Ch.M. (Sydney),

Honorary Radiologist, Saint Vincent's Hospital, Sydney.

I am convinced that when the medical profession as a whole becomes more familiar with the advantages of cholecystography by means of sodium-tetra-iodo-phenolphthalein, it will assume the same importance in the diagnosis or exclusion of pathological changes in the gall bladder as the barium meal and pyelography have done in their respective spheres.

Before discussing the test itself I would like to review very briefly and quickly the function of the gall bladder as it bears on cholecystography since the test is one of functional as well as anatomical abnormality.

Functions of the Gall Bladder.

There are only two important functions of the gall bladder known: (i) It regulates the pressure of bile in the biliary tract; (ii) it concentrates the bile.

In regard to the former the gall bladder is the only yielding portion of the whole biliary tract and the only part that can make allowance for variations in the quantity of bile. It thus maintains a fairly uniform pressure in the biliary tract.

Secondly, while in the gall bladder the bile undergoes considerable concentration due chiefly to the absorption of water by the walls of the gall bladder. Normal bile obtained from a fistula contains approximately 1·5% to 3% of solids, while normal gall bladder bile contains 9% to 14% of solids.

It has been suggested that the gall bladder also acts as a reservoir. However, the gall bladder normally only holds about thirty cubic centimetres (one ounce) of bile and since the liver secretes this quantity in an hour this action must be regarded as negligible.

The bile enters and leaves the gall bladder by way of the cystic duct, but some controversy exists as to the mechanism by which the gall bladder is emptied. The usual teaching was that the sphincter of Oddi and the gall bladder had a contrary or reciprocal innervation, so that a stimulus such as food in the duodenum caused a relaxation of the sphincter and a contraction of the gall bladder. On this assumption is based Lyon's method of non-surgical biliary drainage. He found that concentrated magnesium sulphate introduced into the duodenum through a duodenal tube promoted a flow of bile.

Recently, however, grave doubts have been cast on this hypothesis and the tendency now is to assign to the gall bladder a purely passive rôle. The results of cholecystography support this view.

I do not know of any case in which a gall bladder has been seen to contract actively. It will not react to any of the known stimuli, such as electricity, heat *et cetera*.

In three cases I have had the opportunity of watching the opaque gall bladder during Lyon's method of drainage, by screening and by skiagrams with the duodenal tube in position. There was certainly no sudden contraction, although there was a gradual diminution in the size of the gall bladder.

We now hold that the gall bladder itself under ordinary conditions plays no part in its emptying but merely accommodates itself to its lessened contents by the elastic recoil of its walls assisted by intraabdominal pressure. The flow of bile into the duodenum and consequent emptying of the gall bladder appear to depend entirely on duodenal peristalsis. The distal end of the common duct passes obliquely through the wall of the duodenum for about 2·5 centimetres (an inch). Each peristaltic contraction passing along the duodenum passes along the distal end of the common duct and alternately relaxes and compresses this portion of the duct, squeezing the bile into the duodenum. Magnesium sulphate in the duodenum will excite a flow of bile and anyone who has practised cholecystography must have observed the rapid reduction in size of the normal gall bladder after the ingestion of fats. These substances increase the flow of bile because they increase duodenal

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on August 25, 1927.

peristalsis and any substance that will stimulate peristalsis in the duodenum will increase the flow of bile. However, the gall bladder has a muscular coat and although poorly developed it is probable that under conditions of extraordinary stimulation it will actively contract.

Thus we may assume that fasting will cause the gall bladder to fill and remain filled while food, especially fats, will cause a flow of bile and partial emptying of the gall bladder.

Technique.

These conclusions have a most important bearing on the technique we employ and the interpretation of the skiagrams. Sodium-tetra-iodo-phenolphthalein or its isomer phenol-tetra-iodo-phthalein have now completely supplanted the bromine salt owing to their higher atomic weight allowing of a smaller dose. It may be given by the intravenous or the oral method. After being introduced or absorbed into the blood approximately 98% is excreted by the hepatic cells of the liver and thus reaches the gall bladder in the bile. Here, owing to its relatively high atomic weight, due to the iodine content, it absorbs more X rays than do the surrounding tissues and so casts a definite shadow of the viscus.

I may remark here that this is the first time that we have used the physiological function of an organ to afford us an artificial contrast medium.

There is much discussion as to whether the drug should be given intravenously or orally. I invariably use the oral method because it is so much easier for everyone concerned and if properly carried out practically as reliable as the intravenous method. Certainly it may be argued that in giving the drug intravenously we introduce into the blood a known quantity but by the oral method we give more drug than is actually necessary so that it does not matter if a little is unabsorbed since our object is merely to render the bile stream opaque, not to test the liver function.

Whatever method is used, the main essential is to employ a salt that is absolutely pure. If impurities are present, then toxic reactions such as nausea, headache, vomiting and diarrhœa will always occur.

I have never yet used an English or German preparation that did not give toxic reactions. At any rate up till recently they were all impure. The drug deteriorates quickly on exposure to air and must always be kept in sealed capsules or ampoules.

In the last hundred cases I have done I have not had any toxic reactions. Many did not notice anything out of the ordinary at all, while most had a slight feeling of nausea after taking the capsules and a couple of bowel motions the following morning due to the phenolphthalein—a very excellent thing to happen. Only one patient vomited several hours after taking the capsules.

The dose for an average sized patient is 3·5 grammes (about fifty grains) which can be increased to five grammes (seventy-five grains) for a large patient when given orally.

I do not intend to take up time discussing the question of technique except in a general way. When giving the drug intravenously the same precautions must be taken as for any other intravenous injection, particular care being taken against extravasation.

Two special difficulties arise in giving the drug by mouth. Firstly, the hydrochloric acid in the stomach will convert the soluble sodium salt into the insoluble acid and secondly the salt has an irritating effect on the gastric mucosa. Both these may be overcome by administering the salt in capsules of pills well coated with keratin or salol. This coating is insoluble in the acid medium of the stomach while quite soluble in the alkaline medium of the intestine. If the coating is not sufficient the patient experiences nausea and perhaps vomiting and the following day capsules may be seen lying undissolved in the colon.

General contraindications for injecting the dye are the presence of toxic hæmolytic jaundice when the patient is liable to give a severe reaction and the presence of a low blood pressure since a distinct fall of pressure takes place soon after injection. The only cases in which the oral administration is contraindicated are those in which the patients are so ill that the giving of a large dose of almost any drug would be dangerous. In these cases it is hardly likely that the test would be of any value. If at any time a severe reaction does occur give 0·5 cubic centimetre of adrenalin.

As regards the method of examination I would again like to be as brief as possible.

For the oral method the patient should have the intestinal tract thoroughly cleared out and the following morning should have preliminary skiagrams taken in the usual way. Ordinary lunch is allowed and a light tea containing eggs, milk and butter. This empties the gall bladder so that it may later fill with freshly excreted opaque bile.

The patient takes the capsules several hours later, 0·6 gramme (ten grains) every quarter of an hour until the full dose is taken. Further skiagrams are obtained twelve and fifteen hours afterwards, no food or drink being allowed in the meantime except water. A good meal is then given containing a large proportion of fats and another examination made two or three hours later. If necessary a further examination can be made.

At the sixteen hour examination the patient should be examined by the screen and any tender point exactly located.

When the dye is given intravenously examinations are made eight hours and twelve hours afterwards.

Interpretation of Results.

First examine the skiagrams taken at the preliminary examination. Unless these show the lower margin of the liver and the kidney outline they cannot be considered satisfactory and could not be expected to show a gall bladder shadow. It is generally held that if the shadow of the gall bladder appears on a film without the dye it is always an indication of pathological change. I do not believe this. I think that a really excellent film will in

some cases show the shadow of a normal gall bladder if filled with thick bile. This shadow will be checked at the later examinations to differentiate it from other shadows that may occur, particularly those caused by portions of the bowel or by the lower part of the quadrate lobe of the liver. Of course, in some cases there may appear definite shadows of opaque gall stones, in which event I see no advantage in continuing. The diagnosis is made. In all doubtful cases, however, the test should be completed.

The Normal Gall Bladder.

Now as regards the normal gall bladder. On the twelve hour films, or eight hour, depending on the method used, there should be a distinct shadow of the viscus filled with opaque bile. Four hours later the shadow is of slightly increased density owing to the absorption of water by the walls of the gall bladder. At the examination made after food the shadow should appear greatly reduced in size as the gall bladder empties.

The gall bladder like the stomach varies according to the habitus of the patient. In an asthenic enteroptotic person the gall bladder will be long and dependent, in many cases reaching below the level of the iliac crests. In a robust sthenic individual the gall bladder will generally be found to be short and broad and lying high up under the liver. However, the shadow may be found anywhere in the right hypochondrium. A normal gall bladder twelve to fifteen hours after the administration of the sodium salt should cast a shadow at least as dense as that of the ribs. This rule holds good for all sizes of patients and for all techniques. If the shadow is any less dense then there is something wrong either with the gall bladder or the technique.

In these cases the colon should be examined on the skiagrams for evidence of unabsorbed dye and if necessary another dose given. The shadow should be homogeneous and regular in outline. The gall bladder generally runs for a short distance along the under surface of the liver before hanging down into the abdomen. There is therefore a curve or bend at the point where it turns downwards. Viewed antero-posteriorly on an X ray film this often appears as a kink. However, a lateral view will usually clear up this difficulty. Two to three hours after food the normal gall bladder shadow should have diminished to at least half its previous size.

The Pathological Gall Bladder.

I have been frequently asked to do this test on a patient suffering from chronic obstructive jaundice. In these cases a preliminary search should be made for opaque stones in the biliary tracts, but it is generally useless to give sodium-tetra-iodo-phenolphthalein. If the obstruction is in the common duct the gall bladder is either contracted and functionless or else greatly dilated, depending on whether the obstruction is intermittent or constant. In the former case no bile can enter the gall bladder, while in the latter any freshly secreted opaque bile that reached the gall bladder would be greatly diluted. If the obstruction is above the cystic duct no bile can reach the gall bladder.

Gall Stones.

Gall stones consist of a mixture of cholesterin, bilirubin and calcium carbonate in varying proportions. Calcium is opaque to X rays, but cholesterin and bilirubin are quite translucent. Thus if the calcium content of the gall stones is high, 5% or over, we may expect a shadow by ordinary methods of X ray examination, but pure cholesterin stones are completely translucent and ordinarily cannot be seen.

All gall stones will cast a shadow on a skiagram of an excised gall bladder. This does not mean that they will show when in the body by a direct X ray examination. Conditions are totally different.

As to the percentage of gall stones that can be demonstrated without the aid of cholecystography opinions differ widely, but I think that in expert hands 40% is approximately correct. In hospital practice I do not think this figure is above 10% or 20%. Thus, in considerably more than half the number of patients that actually have gall stones these cannot be demonstrated by an ordinary X ray examination.

After sodium-tetra-iodo-phenolphthalein has been given these translucent stones become surrounded by opaque bile and can be easily recognized by the negative shadows which they cast. These negative shadows will correspond to the shape of the gall stones, in many cases being definitely faceted. In the case of smaller stones the shadow of the gall bladder will present a characteristic mottled appearance. Sometimes both these appearances may be seen in the same patient, one part of the gall bladder containing large faceted stones, while another part, usually the distal end, is filled with small stones.

Great care must be taken to differentiate the negative shadows of true gall stones from the negative shadows caused by flatus in the second part of the duodenum which frequently overlies the gall bladder. These may closely simulate the appearance of gall stones and if any doubt exists, further skiagrams should be obtained after massaging the abdomen. If due to flatus, the shadows will generally be found to have altered their relation to the gall bladder.

Flatus in the transverse colon may obscure the gall bladder, but seldom resembles stones. This may be removed by an ordinary enema.

After the gall bladder has emptied it will be found that the stones have retained some of the dye between their surfaces and show on the film as definite ring-like shadows. If there are only a few small stones present, they may escape detection, since they do not displace sufficient of the opaque bile. The most favourable time to see them is on the films taken after food when the gall bladder is only partially filled.

If at the time of examination there is a stone in the cystic duct, no bile can enter the gall bladder and thus no shadow will appear.

It is conceivable that the gall bladder might be so tightly packed with small translucent stones that its lumen would be entirely occluded. In a case such as this we would fail to obtain any shadow of the gall bladder.

Cholecystitis.

I do not think that our knowledge of cholecystography is as yet sufficiently advanced for us to give definite information in the milder cases of cholecystitis. In the more advanced cases, when the mucosa is grossly pathological or the walls thickened and œdematous we can certainly obtain information as to its condition, both organic and functional.

If the mucosa is healthy, its power of concentrating the bile will be good, so that if the shadow at twelve hours is of good density and at sixteen hours is definitely more opaque, it is probable that the mucosa is at any rate not grossly inflamed. Again, if the gall bladder fills well and empties quickly after food, we are justified in assuming that there is no loss of elasticity and therefore no gross inflammatory thickening or œdema of its walls.

Persistent faintness of the shadow can in nearly all cases be taken to indicate chronic cholecystitis.

However, as I said before our knowledge of the appearance of the opaque gall bladder in cases of cholecystitis is as yet very limited, since these patients seldom go to operation.

Adhesions.

Cholecystography is certainly of great assistance in the presence of adhesions, but the diagnosis should be made only with great caution. It must always be remembered that pressure is applied to the patient while making the skiagram and neighbouring structures sometimes produce an apparent deformity. These patients must be very carefully examined with the screen. However, the shadow of the gall bladder may show a ragged outline in part of its extent, indicative of pericholecystic adhesions. In these cases barium should be given and the relation of the duodenum to the gall bladder ascertained.

A band of adhesions may cut across the gall bladder and practically divide it into two loculi. This shows as a deep incisura in one or both sides of the gall bladder shadow.

Congenital or acquired anomalies of the gall bladder occur, such as biloculation or perhaps a rare condition in which the fundus is produced into a point and, curling round the anterior border of the liver, lies between the liver and the costal cartilages.

In cases of adhesion or anomalies we can give information as regards the functions of the gall bladder and this I regard as of more importance than its actual shape.

Conditions Which Fail to Give any Shadow.

In all cases in which a satisfactory shadow is not shown after the administration of the dye, the test should be repeated. This should always be done in order to exclude any irregularity in the technique or even perhaps temporary obstruction of the cystic duct. If no shadow of the gall bladder appears after the second dose of the sodium salt, then a pathological lesion is present. So long as the technique has been carried out properly, this conclusion is quite definite and constant, in all except a very few cases.

The non-appearance of the shadow may be due to (i) obstruction to the cystic duct, the most common forms being stone, inflammatory thickening or tumour pressure; (ii) the gall bladder may have had its lumen obliterated, due either to chronic inflammation or tumour or from being completely packed with very small translucent stones; (iii) cholecystitis with empyema of the gall bladder. In these cases we should content ourselves with diagnosing the presence of gross pathological change and should not endeavour to narrow the diagnosis.

Conclusion.

Now in conclusion how far has this method advanced our X ray diagnosis of the gall bladder? I think that gall stones can be diagnosed in 95% of the patients that actually have them. When we diagnose gross changes on the grounds of absence of shadow or persistent faintness of the shadow, the diagnosis will be borne out in about 93% of cases. Taking into consideration all patients that we examine by this method in our hospital or in our private practice with apparently normal or apparently pathological conditions, I believe that our conclusions will be correct in approximately 90% of cases.

However, we must always realize that this test is merely a link in the chain of evidence and although in some cases the X ray appearance is pathognomonic, in most the final diagnosis can be made only by the physician or surgeon.

ELECTRICAL ACCIDENTS.

By BEDE J. HARRISON, M.B., Ch.M. (Sydney), D.M.R.E. (Cantab.),

Honorary Radiologist, Saint Vincent's Hospital, Sydney.

Importance of Prevention.

ANY organization which supplies a public utility in the form of electrical energy has to consider two phases of accident prevention—mechanical and electrical—each in relation to three classes of people, the employees, the customers and the careless and foolish meddlers and in so doing should be guided by the axiom: "Accidents can always be prevented."

In the experience of the Insull organization dealing with approximately fifty thousand employees, practically all engaged in production and distribution of electrical energy, it has been found that the accidents which cause personal damage to the employees are in 93% of cases purely mechanical in type, for example a fall over a case or a nail

run into the foot. In only 7% of the cases is the personal injury due to the particular energy (electrical) which is being handled. But (and the significance of this is too great to be dismissed lightly) the 93% of mechanical accidents claim only 25% of the company's annual bill for compensation under the head of "accidents," while the 7% of electrical accidents are responsible for 75% of this annual compensation account. In other words, the damage done to the injured individual by the average electrical accident, estimated in terms of the employer's money, is one hundred and sixty times more costly, or from the workman's point of view the average electrical accident is going to incapacitate him approximately one hundred and sixty times as much as the average mechanical accident. This is sufficient to emphasize both the economic and the humanitarian points of view which enter into any discussion of this subject.

The importance of enabling the employee to realize that a real interest is being taken in making his employment in an electrical trade less hazardous must be appreciated by those who believe that the contented employee is a good employee.

The experience of industry in general teaches that 25% to 30% of accidents are due to lack of mechanical safeguards, while about 70% to 75% are due to the failure of the human element. Further analysis of these figures in the electrical industry only shows that the failure of the human element occurs most frequently, not in the injured man himself, but in others connected either with the design of the equipment or in the methods of employing it. "It is not the man who fails who is hurt." In other words, we are justified in asserting that in electricity supply properties actual physical hazards are responsible only for a very small percentage of the accidents involving the personnel.

The greater percentage of such accidents is chargeable directly to the use of unsafe and therefore improper methods.

Man has always shown clearly that he must be driven to do those things and use those methods which will enable him to perform his work with the minimum amount of danger to himself and to others and committees of safety, operating among the installation as well as among the employees, are necessary adjuncts of accident prevention.

Causes of Accidents.

Accidents are attributed to:

1. Faults in the injured person.
2. Faults in the injured person's fellow workmen.
3. Faults in the injured person's superior officer.
4. Faults in the equipment (bad design).
5. The hazard associated with inefficient functioning of any equipment, no matter how well designed, due to mechanical breakdown.
6. Uncontrollable circumstances (for example, lightning).

Fault in the Injured Person.

The injured person may be at fault because of:

(*a*) His unsuitability for the work.
(*b*) Carelessness.
(*c*) Fatigue.
(*d*) Illness.
(*e*) Worry.
(*f*) Intemperance.
(*g*) Haste.
(*h*) Ignorance.
(*j*) Familiarity.

Each of these conditions is preventible as a cause of accident.

No man should be called upon to perform an especially difficult task, for example, the repair of live lines, unless he has a mentality which is capable of appreciating the extra risks involved. This question of suitability, therefore, rests largely in the hands of the foremen and it is to them we must look to see that no man is called upon to perform a dangerous duty which carries a greater risk to him than he is capable of fully realizing. The foreman in turn will look to his committee of safety for advice.

Similarly the careless, habitually careless, man has no right to be employed in a dangerous occupation. It is, of course, not his fault if he is so employed.

Fatigue, illness, worry and haste which disturb the power of concentration on the work in hand, are of course often unavoidable, but a thorough and proper understanding by employees of the increase in risk, due to lack of concentration, would encourage them to pay more attention to these conditions.

Intemperance should be a bar to employment in anyone seeking for a position which will bring him into the danger zone.

Ignorance can and must be removed. One cannot help thinking that it is criminally negligent to ask a third class linesman to do the work of a first class linesman or to ask an apprentice to perform a journeyman's task, without first making sure of his knowledge of the necessary safe methods of working. This ignorance has another aspect which is seen still more frequently and is best illustrated by an accident related by Professor Jellinek who was called one day, accompanied by an electrical engineer, to a fatal case of electrical accident to a young student.

The engineer, remarking on the physical factors of the case, expressed his opinion that "220 volts is very disagreeable, but not unbearable" and placed his hand on the wire and bore the current, while near him still lay the body of the student (fifteen years of age) who had just been killed by the passage of that very current.

We frequently see workmen, in dealing with circuits of 110 volts, take no precaution, not even bothering to open the switch. This in spite of recorded deaths where the voltage reached only 60. This familiarity with the sensation, due to low voltage current, can be discounted only by constant preaching of the danger of touching any live wire. Posters entitled "110 volts can kill" are exhibited in many electrical workshops as a constant warning against the foolhardiness indicated above.

Fault in the Injured Person's Fellow Workmen.

The fellow workmen may be at fault in each or all of the same ways as the victim himself, but in addition he may cause injury by closing a circuit on which his fellow workman is employed. This happening can nearly always be traced to faulty or at least slack methods and the due apportionment of blame will heavily inculpate the foreman. It is to him, therefore, we must look to avoid this particular type of accident.

Fault in the Superior Officer.

The superior officer may be at fault (in addition to the suggestions above mentioned) in not giving sufficient or in giving too many men for the particular work, in issuing instructions capable of different interpretations, in not making certain that his instructions are exactly understood, in being too indefinite, in short in not carrying out what is commonly recognized as good practice.

Some of this can be overcome by having every instruction which is given by word of mouth, repeated by the recipient and in having every important switch opened and closed only by the co-operation of two employees.

In some of these cases the superior officer will be reminded that his instructions are not sufficiently accurate and he will be able to alter them in time. Instruction of the superior officer on the question of risks will go far to remove this from the list of causes of accidents.

Again, the attitude of foremen and superintendents is important. If these men show plainly, not only that they believe in sane safety rules and practices, but that they also propose to have them observed by the men for whom they are responsible, then accident prevention will be made much easier.

Faulty Equipment.

With the rapid spread of the household use of electrical energy, faulty equipment as a cause of accident will grow rapidly in importance because of the unskilled users of power meeting with trouble through ignorance. We find, as far as engineering practice is concerned, that certain definite steps have been taken to standardize practices to insure safety. The Factories Department of the Home Office in London has issued a series of regulations which are supposed in a general way to cover all possible conditions and to ensure good, safe practice without limiting the discretion of the contractors as to the exact details whereby such practice may actually be worked out.

The Institute of Electrical Engineers in London has gone into further detail regarding regulation for the electrical equipment of buildings and it is at present considering a similar series of regulations dealing with power houses and transport systems in connexion with the rapidly advancing electrification of England.

The Bureau of Standards at Washington has issued a still more comprehensive handbook which covers practically the whole field.

As all of these regulations become altered from time to time it is advisable that copies be procured regularly, so that any further advances in safety devices or regulations may be examined as they appear and accepted or rejected as local customs and conditions demand.

The question naturally occurs: How can one be certain that the customer's electrical appliances are safe? No attempt seems to have been made so far to insist on this. It would be well for the Commonwealth to set down certain safety regulations regarding all domestic and ornamental electrical appliances, sweepers, toasters, heaters, lamps *et cetera* and to make sure that no electrical equipment is imported into or manufactured in Australia which does not comply with safety regulations.

It costs less to build a dangerous electrical iron, for instance, than to build the safe one and therein lies a great risk unless such a set of safety regulations as has been mentioned be fixed to apply to all our electrical equipment.

When we realize that the vast majority of electrical accidents occur under this head and occur because of the trust that the employee places in the safety of the equipment or shop practice or that the consumer places in the safety of his household appliances, we must be prepared to pay especial attention to the various factors indicated, if we wish to keep our list of electrical accidents down to a minimum.

Ordinary Mechanical Hazard.

Modern methods of manufacture make ordinary mechanical hazard much less important than it formerly was. The breaking of a cable, the fall of a post, are nowadays not common and the statistics show such occurrences to be the cause of only a relatively small percentage of electrical accidents. As time goes on this hazard becomes of increasingly less importance.

But with the increasing use of buried cables a further risk is added and a case is recorded in Vienna, where a woman was electrocuted in her bath (although no electric wires were in the room) by a current which had come along the water pipe from outside the bathroom, originating from a corroded buried cable.

Uncontrollable Circumstances.

Storms, with upsetting of posts, cables *et cetera*, through wind and rain, form a basis of certain accidents, while lightning, the action of which in accidental injuries is apparently identical with that of electrical shock, supplies a few examples every year of conditions which must be treated medically in exactly the same way as most electrical accidents.

The Electrical Accidents.

The accident itself occurs in one of two main forms. One is an accidental contact for a short period of time, the circuit being broken immediately by the patient's falling away from the conductor or the line fusing *et cetera*. The other is a contact for a longer period in which the patient either grasps a live conductor, and as a result of muscle spasm cannot let it go or he falls on to a conductor or a conductor on to him and his unconsciousness,

injury or spasm prevents him from getting out of danger.

In the first class of case there is often a mechanical factor to be reckoned with in considering the patient's condition.

An example occurred in June, 1924. A man who was working on a ladder slipped and came into contact with a live wire carrying 4,400 volts. He was rendered unconscious, but after thirty-five minutes' work, was resuscitated and walked to a conveyance. He died eight days later in hospital from a fractured skull which had been overlooked in the excitement of the immediate electrical injuries he had sustained.

In these cases the question of freeing the patient from the contact does not arise.

In the second class of accidents the first thing to be done is to break the circuit. This can sometimes be effected by the injured person.

A man caught hold of a badly insulated electrical wire carrying 220 volts alternating current with his left hand. The muscular spasm prevented him from letting it go, but seizing a paint brush with his right hand he knocked the wire away from his left hand—this after he had been unconscious for several seconds.

Usually the patient is unable to free himself, often unable to call out for help and unless the bystanders, fellow workers or others act promptly, he may be beyond aid when relieved. This freeing of the patient presents great difficulty and no perfectly satisfactory mode applicable to all cases has yet been formulated.

The switch controlling the circuit should be opened where possible and if this is to be done it is necessary that the switch be right at hand. If this is impossible the patient's loose clothes (tail of coat) should be used to drag him away from contact. Failing this an axe with a wooden handle may be used to cut the line, the axeman's eyes being well protected against the flash which will occur or the live wire may be earthed by throwing across it a chain, one end of which is efficiently earthed. Finally, a non-conductor, for example, a leather belt or sheet, may be placed around the patient and used to drag him free.

Not one of these methods is applicable to all cases and especial care must be exercised in attempting anything which involves the touching of either the patient or the wire.

Special tool boxes containing all the necessary appliances, including hook, ebonite sticks of varying lengths for dragging the patient off the conductor, insulated wire snips and cutters, insulating gloves and shoes, restoratives *et cetera* have been manufactured by the *Hanseatische Apparatenbau* of Hamburg (Germany) under Professor Jellinek's direction. But such tool boxes have a habit of being far away from the scene of an accident when required.

Some such equipment, however, should exist in every power house or substation.

Where Accidents Occur.

A series of accidents in a generating and distributing service were examined from the point of view of where the accident occurred and it was found that 30% of accidents occurred on poles; 8% while the employees were ascending or descending and these were all complicated by mechanical injuries; 34% occurred while the employees were working on or adjacent to live apparatus; 12% from accidentally slipping; 2% from unsuitable tools; 8% from lack of supervision and 8% from failure of insulation; 6% from careless stringing of service line.

Accidents affecting linesmen form a large percentage of all electrical accidents. So pronounced is this that a special "Accidents Provision for Linesmen" has been drawn up and issued by the National Electrical Light Association.

Medical Aspects.

The question is often asked, what voltage is dangerous to life? The answer is contained in the statement that deaths have occurred at all voltages from sixty upwards. The nature of the contact, wet hands, earthing of the individual, wet cement floors *et cetera* affect the severity of the electrical damage.

An ordinary light bulb, for instance, may become dangerous through the presence of dust and moisture. The nature of the current, alternating more dangerous than direct; the number of cycles, the more numerous the greater the danger; the state of the patient's health; all affect the seriousness of the accident.

It is to be noted that the passage of current through both legs is not usually fatal, whereas the passage of the current through both arms very frequently is.

The effects of electrical accidents upon the human organism are both local and general. Of the general effects the most important is that of immediate death. But death may also occur otherwise. Some minutes of consciousness may elapse from time of release from the circuit and death or again the patient may recover from apparent death on several occasions before finally dying and occasionally death is delayed for some days, the heart musculature becoming suddenly dilated. Herein lies the necessity for keeping in bed for at least two weeks all patients who have been severely shocked.

Currents below 200 volts usually kill by cardiac fibrillation; currents above 1,000 volts by respiratory failure.

It cannot be too forcibly emphasized that the unconsciousness with cessation of respiration which occurs immediately after shock, is usually only an apparent death. Time and again have patients been rescued from this state by long, continued artificial respiration, carried on sometimes for four hours. This is the most important fact in the clinical history of electrical accidents.

Short of death we find unconsciousness, either immediate or delayed, often quickly recovered from and leaving the patient sufficiently well to resume his work, but there is usually a sensation of great fatigue and exhaustion with a feeling of tension in the muscles and tingling in the finger tips. Headache is very common; dilatation of the heart and air hunger practically always present. The pulse is hard and tense, not infrequently slow; respiration

is slow and at first shallow; limbs are relaxed and helpless.

Micturition and defæcation are inhibited; constipation may be present for as much as eight days; acute pulmonary or cerebral œdema with epileptiform convulsions even reaching a *status epilepticus* and dulling of sensation may occur. Paræsthesia and intellectual damage are rare. Paralysis, paraplegia, hemiplegia or strictly localized paralysis may occur. The urine contains nucleoalbumin and seroalbumin, while sedimentation reveals red blood corpuscles.

Death sometimes occurs with uræmic symptoms. Rapid muscular degeneration, probably trophic, the result of nerve damage, occurs in a shocked limb, being noticeable three days after the accident. Flickering of the eyelids, changes in the width of the pupils, giddiness and tinnitus, dysphagia, laryngeal spasm and alteration in the sense of taste are present. The blood manifests a leucocytosis with relative lymphocytosis.

Local Effects.

Local effects include burning, metallic impregnation of the tissues, sprinkling of the patient with small pellets of pure metal, alteration in the colour of the tissues or the formation of electric marks (*Strommarken*), the incidence of these depending upon the mechanical factors affecting contact. Burning in the ordinary sense appears when arcing occurs and of course may happen even where the patient is not mechanically in the circuit.

In such cases it is a simple burning condition and follows the usual clinical course of burns of similar severity from ordinary heat sources. Some degree of this is present in almost every electrical accident.

Metallic impregnation of the tissues occurs in almost all cases. It is due to volatilization of the metal in the circuit and it represents a burn due to hot vapour. Healing is hindered somewhat by the presence of the finely divided metal in the superficial tissues. But when uncomplicated by other types, it is usually only superficial and healing occurs fairly rapidly, although the pigmentation usually remains.

The mechanical force of short circuit frequently tears small pieces of metal from the conductors and these become embedded in the tissues usually only superficially; although they are often very numerous. There are no special clinical features about these cases.

Alteration in the colour of the tissues occurs when there is damage to the tissues from the heat generated by the resistance offered to the current. These lesions create great difficulty, as they offer all the characters of burns of the third degree, involving even the bone and causing carbonization of the soft tissues and calcination of the bone—the result of actual melting.

Such burns are extremely painful and take a long time to heal. There is usually more extensive damage to the tissues than would at first appear and for this reason the prognosis in these cases should be guarded.

Treatment should be conservative, unhealthy sloughing tissue removed by snipping, the wounds kept quite dry, covered only with vaseline, exposed to air and light as much as possible.

Electric marks represent a clinical entity specific to electric lesions (including lightning). They would appear to occur where contact has been perfect and represent a special change in the tissues (not due to heat) which resulted from the passage of current of sufficient strength.

The special lesion is one involving the skin and consists of a central dark depression surrounded by a lighter colour (whitish) elevation around which there is a less prominently marked and narrower band of darkened tissue again. The lesions may present various conformations—circular, linear, spiral or a combination. The histology shows that the cells of the outer layers of epidermis are closely pressed together as if mechanically. The cells of the *rete Malpighii* and the nuclei are elongated to five or six times the usual length. The papillæ are all flattened. The central depression may even reach the bone which then shows a definite type of response —that of extensive periosteal reaction.

Clinically these marks are not painful; they are slow in their progress and healing, but they tend to remain aseptic and to run a benign course.

There would appear to be a molecular change in the cells which gradually goes on to cellular and molar death. In case of a shock entering *viâ* the hand and leaving *viâ* the feet, the hand may look normal after the accident, but in two or three weeks changes become apparent which go on to complete dry gangrene of the part, reaching as high as the axilla.

The condition seems to affect primarily the blood vessels and attempted amputation of a damaged limb, with necessarily the ligation of an artery, may be followed by secondary hæmorrhage as a result of cellular death of the arterial wall.

A case has occurred in which ligation at the wrist after amputation of the hand was followed by secondary hæmorrhage necessitating ligation above the elbow. Secondary hæmorrhage supervened on this and ligation in the axilla was practised. This in turn was followed by a still further secondary hæmorrhage ending fatally.

The usual clinical course of an electric mark, if properly treated, is this. No apparent change in the mark appears for two or three weeks. Then a slough appears, two or three times larger than the original mark. It may in severe cases extend through the whole thickness of a limb and above the original site. The sloughs gradually separate, exposing muscles, tendons, blood vessels, nerves or even the bone. During this stage no movement at all should be permitted, because the molecular damage to the subjacent structures cannot be accurately estimated and too early movement may cause rupture. The process, if properly treated, is aseptic and a patient whose whole arm manifests a condition of definite electrical œdema with extensive sloughs, may have no fever throughout the course of a spontaneous amputation, with dry gangrene, extending over eight weeks. But during the first

fourteen days the patient should not be allowed out of bed because of the risk that the heart muscle may also have undergone a certain amount of molecular degeneration.

Treatment of Actual Lesion.

The chief point to be remembered in treating these patients is that a minimum of interference provides the best result. The immediate effect of the great heat generated is absolute sterilization of the part. Every attempt must be made to preserve this condition of asepsis.

If the patient comes under treatment immediately the local application of radiant light will help to keep the surfaces dry and so prevent the formation of moist slough, at the same time producing localized congestion to help the process of repair. Pain will be remarkably lessened. General irradiation will at the same time help to relieve the congestion of the viscera by increasing the functional activity of the skin and aid the action of the ultra-violet light which is the main factor we can employ to keep the lesions sterile. Both radiant and ultra-violet light should be employed daily. The patient looks for it and as this line of treatment requires no dressing, he naturally prefers it to the usual methods adopted. Blisters are not opened, they are allowed to absorb. Scabs are not pulled off, they are allowed to fall off. A loose garment is the only covering, if one is to be employed at all. The final cosmetic effect and the absence of pain and discomfort are astounding. While the treatment is effective in its asepsis there is no rise in temperature. It is necessary on occasions to use rubber sheets to prevent lesions from sticking to the bed and rubber likewise must be placed between approximating burnt surfaces, for example, fingers. No dusting powders and no greasy ointments should be employed and the scabs which form, must not be disturbed. The amount of skin grafting required after this treatment is incomparably less than would be anticipated.

If the patient is seen when the period of asepsis is over, with fever and with pain, moist surfaces *et cetera*, it is necessary to prepare the lesions for the light treatment. Under anæsthesia all unguents and other applications must be cleaned off, scabs and *débris* removed; overhanging dead tissue is cut away so as to leave as smooth a surface as possible. The whole field should be vigorously cleansed and the nail brush used if necessary. The light treatment as indicated above should then be administered. The temperature may settle down immediately. If not, further anæsthesia and cleansing may be necessary, but only as a preparation to thorough treatment with radiant and ultra-violet light which remains the chief help in sterilizing and healing the lesions.

The Apparent Death.

There is ample evidence that the absence of the usual signs of life in a patient, subject of an electrical shock, is not to be interpreted as indicating that death is instantaneous.

A patient whose head came in contact with a live wire, was found at *post mortem* to have a hole burnt through the calvarium and brain matter was oozing out. Similar brain matter was found in the lungs and in the stomach, showing that the patient both swallowed and breathed after the incidence of the fatal shock.

A man was shocked and his companions ran away. A quarter of an hour later they returned and pulled him off. He was dead apparently, but subsequent microscopical section of the arm by which he was pulled off, revealed a vital reaction. This must, therefore, have commenced a quarter of an hour after the incidence of the shock.

A man was shocked, the current was turned off and he was apparently dead. The *post mortem* examination revealed a fractured skull with evidence of a reaction around it. Hence he could not have been dead when the current was switched off before he fell.

Patients have recovered through persistent efforts at artificial respiration by fellow workmen after the doctor has pronounced life extinct.

It is evident from this that there is a distinct interval of time in practically all cases between the onset of apparent and the moment of real death. Some evidence tends to show that this may be as long as fifteen minutes. Whatever the exact period may be it can be easily recognized that many lives could be saved by the application of proper methods of resuscitation during this period.

Resuscitation.

Many are the suggestions which have been made regarding the best mode of resuscitation, but only one need occupy our attention. There certainly appears to be a feeling among those who see many actual electrical accident cases, that a counter shock has a distinct influence on helping those patients to recover. But there is no accumulation of evidence, sufficiently authentic, to make me feel that this method is really worth while.

Artificial respiration is the only method which bears the stamp of success, and to obtain the maximum results this should be carried out according to Schäfer's method only. It must be continued for four hours if necessary or until *rigor mortis* sets in.

It has saved hundreds of lives and bears none of the objections which can be levelled at all forms of motor apparatus designed for the forcible inflation and deflation of the lungs. The details of this method are as follows:

As soon as the patient is clear of the circuit quickly feel with the finger in his mouth and throat and remove any foreign body (false teeth *et cetera*). If the mouth is tight shut, pay no more attention to it until later. Do not stop to loosen the patient's clothing, but immediately begin actual resuscitation. Every moment of delay is serious. Proceed as follows:

1. Lay the patient on his belly, one arm extended directly overhead and the other bent at elbow and with face to one side, resting on the hand or forearm so that the nose and mouth are free for breathing.

2. Kneel straddling the patient's hips with knees just below the patient's hip bones or opening of pants pockets. Place the palms of the hands on the small of the back with the fingers over the ribs, the little finger just touching the lowest rib,

the thumb alongside the fingers, the tips of the fingers just out of sight.

3. While counting one, two and with arms held straight, swing forward slowly so that the weight of your body is gradually but not violently brought to bear upon the patient. This act should take from two to three seconds.

4. While counting three, swing backward so as to remove the pressure, thus returning to the former position.

5. While counting four, five, rest.

6. Repeat these operations deliberately swinging forward and backward twelve to fifteen times a minute—a complete respiration in four or five seconds. Keep time with your own breathing.

7. As soon as this artificial respiration has been started and while it is being continued, an assistant should loosen any tight clothing about the patient's neck, chest or waist. Keep the patient warm.

8. Continue artificial respiration without interruption until natural breathing is restored, if necessary four hours or longer or until *rigor mortis* has set in. If natural breathing stops after being restored, use resuscitation again.

The use of a mixture of carbon dioxide and oxygen in a specially devised inhaler has a great influence in preventing the relapse of the patient once natural respiration has been established. But nothing else should be troubled about until the patient takes his first few natural breaths.

The patient should be kept warm. Blankets will not warm him if he is already cold. He must, of course be covered, but artificial heat (warm bottles, warm blankets *et cetera*) should be employed. Ammonia is a stimulant when applied after the establishment of natural respiration.

Hypodermic injections will not induce respiration, but camphor in olive oil is helpful as a stimulant. When respiration is fully established attention can be given to the wounds, the best treatment consisting of the application of vaseline or olive oil on soft clean cloth. Clothing should be cut off, if necessary leaving some adherent rather than forcibly removing them. Splints should be fastened to the damaged limbs by bandaging the healthy parts only. Blisters should remain untouched.

Conclusions.

In view of the foregoing I would recommend:

1. That all lecturers in forensic medicine be asked to emphasize the value in cases of electrical shock of artificial respiration, as carried out according to Schäfer's method, laying very careful stress on the necessity for continuing the procedure for as long as four hours.

2. That all first aid classes, ambulance classes, red cross societies, life saving bodies and such associations be asked to include a special mention of the value of Schäfer's artificial respiration in cases of electrical accidents.

3. That compulsory instruction in safety methods and especially in Schäfer's method of prone resuscitation by means of lectures, motion pictures, stickers *et cetera* be given to all employees in the electrical industries. That such instruction include actual practice of the prone method of resuscitation each week for all employees.

Pages 8 to 17 of the rules for resuscitation from electrical shock by the prone pressure method, issued by the National Electrical Light Association, could be very well used as a basis for instruction in Schäfer's method.

4. That a box of suitable equipment, including oxygen-carbon dioxide inhaler, such as that mentioned, be kept at all power houses and substations.

5. That a system of licensing be introduced to insure that all electrical work be done only by men who have been properly trained.

6. That electrical engineers should be asked to draw up safety rules suitable for local conditions, comparable to the rules now existing in England and America.

7. That safety committees be formed to keep constantly before everyone the dangers of electrical accidents and to see that safety methods be adopted in all branches of electrical work, in addition to organizing the training of employees as indicated in 3.

8. That the State be asked to introduce legislation insuring the safety of all locally manufactured electrical equipment and that the Commonwealth be asked to exercise a similar supervision for all electrical imports.

9. That employers should appoint someone specially interested in electrical accidents to investigate each and every case that occurs among their employees, for the purpose of securing uniformity of treatment and improvement of results.

Reports of Cases.

AN UNUSUAL CAUSE OF DEATH.

By C. H. Mollison, M.B. (Melb.), M.R.C.S. (Eng.),
Melbourne.

An elderly man was found dead in one of the lanes of the city, his body was brought to the morgue, where an autopsy was made.

On opening the chest the tissues of the anterior mediastinum were found to be swollen and inflamed, the pericardial sac was distended with bloodstained fluid and the surface of the heart was coated with bloodstained shaggy lymph; on the posterior surface of the heart between the ventricles a long slender fish-bone was found obliquely embedded in the heart muscle. It appeared to have penetrated the septum and had not reached either ventricular cavity, about one-third of the bone was protruding into the pericardial cavity, it was thickest in the centre, tapering to the ends which were sharply pointed, it measured four centimetres (one and five-eighths of an inch) in length and about 1·5 millimetres (one-sixteenth of an inch) in diameter at its centre. There was no sign of any track by which it had entered the pericardial cavity and neither in the œsophagus nor stomach could any mark of puncture

be discovered, though presumably it came from the former. No history could be obtained as to the symptoms, as deceased apparently had no friends.

Reviews.

BIRTH INJURIES.

Two essays on "Birth Injuries of the Central Nervous System" comprise Volume XI of the "Medicine Monographs."[1] In the first, "Cerebral Birth Injuries and Their Results," F. R. Ford, of the Johns Hopkins Medical School, aims to define more exactly the group of true sequelæ of these lesions. The incidence and morbid anatomy of the intracranial birth traumata are discussed fully. The great predisposition of premature infants to hæmorrhage is emphasized. The possibility of cortical lesion without clinical signs is illustrated by a reference to two cases from Whitridge Williams's clinic in which the infants exhibited all the reactions of normal babies including crying, nursing and vigorous movement, but in which the infants were found at autopsy to have no cerebral hemispheres. These functions depend on the integrity of the medulla and brain stem only. Intracranial hæmorrhage, when recognizable clinically, usually results in death, but in infants that survive, subdural, subarachnoid and intraventricular extravasations usually are absorbed without creating permanent disabilities. Of "about" fifty infants in the Johns Hopkins Obstetrical Department in whom intracranial hæmorrhage was diagnosed, only seven survived two weeks. One of these manifested a permanent hemiplegia, the remainder developed into apparently normal children.

The author then considers Little's disease and marshals the evidence in favour of the generally accepted dissociation of this malady from birth injury. Two hundred cases of bilateral spastic paralysis (including two of flaccid paraplegia!) from the Harriet Lane Home for Children are analysed. Five of these were asymmetrical in type and are considered to be due to birth injury, though a footnote suggests the possibility of more. In a further series of forty-five cases of hemiplegia or monoplegia in children from the same home seventeen are ascribed to birth trauma. Therefore of two hundred and forty-five cases of cerebral paralysis in children he estimates that twenty-two cases or 9% were caused at birth.

With regard to hydrocephalus, one hundred cases are collected from the autopsy records of the Johns Hopkins Hospital and one hundred clinical cases from the Harriet Lane Home. Five of the former are attributed to birth injury and one of the latter, a total of six cases in two hundred or 3%. The author finds in discussion that this proportion is confirmed by other authorities.

In a series of one hundred cases of epilepsy from the Harriet Lane records he states that three were definitely due to birth injury, a percentage in agreement with other authors. Eight cases of this type of epilepsy are recorded from the surgical clinic of the Johns Hopkins Hospital. Operation disclosed intracerebral cysts (false porencephaly) on three occasions, scarring of the pia-arachnoid with cortical atrophy three times, organized subdural clot with cortical atrophy once and no abnormality once.

Finally the author approves of Thredgold's estimate that probably not more than 1·5% of all idiots can be traced to birth injury. Analytical tables, a number of brief case histories, including two interesting records of thrombosis of the superior longitudinal sinus and a bibliography are appended.

The author gives a full dissertation on the results of intracranial birth hæmorrhage. It would be interesting to have some discussion of the results of the diffuse nervous lesions without hæmorrhage referred to in the earlier part of the treatise.

In Part II Bronson Crothers and Marian Putnam, of the Harvard Medical School, give full consideration to "Obstetrical Injuries to the Spinal Cord." Twenty-eight cases are reported in young children who have survived the injury. These fall into two groups. In the first the cord is ruptured by traction which stretches or breaks the spinal column, the lesion usually being in the mid-dorsal region of the cord. In the second group the roots of the brachial plexus are torn from the cord and the cord itself damaged at this level by the evulsion and subsequent hæmorrhage. A history of difficult breech birth is usual in the former group, of head presentation in the latter. Twenty-one of the twenty-eight cases were of the first type, though in one a history of normal birth with head presentation was obtained. In one case the snapping of the spine was distinctly heard, but X ray evidence of spinal injury was not forthcoming. An idea of the frequency of these lesions is suggested by the ratio of cases under the authors' observation in six years of hospital and private practice, twenty-six cases of cord injury, two hundred and sixteen uncomplicated brachial palsies, two hundred and sixty cerebral injuries of birth origin. This is a ratio of survivors. Autopsies on infants born after breech presentation, reveal severe spinal injuries in about 40% of cases. Birth injuries of the spinal cord therefore have an importance which has been overlooked both in obstetrics and neurology. The first recorded case was published by Parrot in 1870 who observed segmental and mass reflexes in the isolated lumbar centres. The authors are to be congratulated on their excellent presentation of their subject.

[1] "Medicine Monographs: Volume XI: Birth Injuries of the Central Nervous System." Part I, Cerebral Birth Injuries, by Frank R. Ford; Part II, Cord Birth Injuries, by Bronson Crothers and Marian C. Putnam; 1927. Baltimore: The Williams and Wilkins Company. Royal 8vo., pp. 178, with illustrations. Price: $4.00 net.

Notes on Books.

ORNITHORHYNCHUS.

MR. HARRY BURRELL has written a book on the platypus which deserves more than passing mention.[1] He has intended his book primarily for general readers, but at the same time he has contrived to include within its pages a wealth of information for the scientific reader. This alone is a remarkable achievement. The author after a brief introduction deals with the discovery and early descriptions of the animal. He discusses its general characteristics and its nervous organization and sensory perceptions. He concludes that despite the present day lack of more precise knowledge the platypus is an animal possessed of acute sensory perceptions, a delicate nervous organization, an active metabolism and a degree of cunning which must be based on considerable intelligence. He holds that this is far from justifying Professor W. K. Parker's epithet of "frog-witted duckbill." It will be remembered that the platypus, like the marsupials, does not possess a *corpus callosum*.

Mr. Burrell discusses at considerable length the function of the spur and the crural gland and the views of other authors on the subject. He concludes that the male animal uses the spur both as a weapon and in order to hold the female during copulation. He then describes the nesting burrow, the habits and haunts of the animal. He further points out that the natural enemy of the platypus is the rabbit and that the latter by burrowing into the river banks has deprived the platypus of his breeding places. He has something to say on its protection. On paper protection is complete, but the author suspects that skins are smuggled out of the country, though he can give no definite information on the point. It is a matter which may be commended to the consideration of the authorities.

This book is one which all Australians with any fondness for natural history should read. Its compilation has evidently been a labour of love to the author and will remain a monument to his industry.

[1] "The Platypus: Its Discovery, Zoological Position, Form and Characteristics, Habits, Life History, etc.," by Harry Burrell, C.M.Z.S.; 1927. Australia: Angus and Robertson, Limited. Royal 8vo., pp. 227, with illustrations. Price: 25s. net.

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Caesarean Section.

THE practice of midwifery may be regarded from three points of view. In the first place there is the attitude of the commercially minded medical practitioner who attends women in their confinements in order to make money. At times the size of the fee is the measure of the length of time of the service. In these days of labour and time saving devices the man who adopts the trade of midwifery employs every expedient that may shorten the hours of attendance at the bedside. Forceps are applied unnecessarily and unwisely. Manual interference is undertaken without hesitation. Minor and even major operations for which special fees are charged, are performed on the slightest excuse. The morality of the midwifery trade is not high. Fortunately the vast majority of medical practitioners is honourable and spurns these practices. Moreover, it is admitted that when conscientious and skilled services are rendered, the medical practitioner should be well paid, for the responsibility is great and the work entails a considerable amount of sacrifice.

In the second place there is the humanitarian point of view. The patient is a human being and her condition is a physiological one. The medical practitioner realizes that in theory at least it lies in his power to reduce her suffering and to guide her and her infant safely through the crisis. He is aware that by constant and careful supervision he can anticipate many of the complications and thus prevent a physiological process from becoming a pathological one. His first concern is the mother. The interests of the unborn infant are secondary and indirect. If he makes a mistake, if his judgement is faulty, if his kindness is greater than his skill and knowledge, his chagrin will be considerable, even if he can persuade himself that an untoward result has been caused by something over which he had no control. The humanitarian practitioner, unless he is influenced by religious tenets, deplores a still birth chiefly because of its effect on the mother. The infant has not lived an independent life; it has no knowledge of its existence and is unaware of the attractions of life. He knows that the tears shed will soon be dried and that when another, healthy babe is born, the disappointment and grief will be forgotten.

The third aspect is the national one. Every woman is a potential mother; every baby is a future citizen; the number of healthy citizens is the index of the nation's strength. These statements may be platitudes, but unless they are remembered in connexion with the care of the pregnant and parturient woman, the medical profession must fail to perform one of its most important functions. The community has a right to demand of the medical profession that the morbidity and mortality among mothers and their infants be reduced to the lowest possible level and that an efficient obstetrical service be available to the whole community.

In this week's supplement containing the Transactions of the Australasian Medical Congress (British Medical Association), Dunedin, 1927, will be found the articles by Dr. A. M. Wilson and Dr. H. Jellett on the justifiable employment of Cæsarean section. In the course of the discussion Dr. Marshall Allan pointed out that this operation is performed very frequently indeed by some practitioners. In well conducted hospitals Cæsarean section was found to be necessary for the safety of one woman out of a hundred. This frequency can be reduced as a result of keener antenatal care and more particularly of the early recognition of the various degrees and forms of contracted pelvis. It should also be remembered that the first labour may be regarded as a test and the fullest information concerning its progress should be gathered. The only other way to reduce the frequency of the operation is to restrict the indications. At the present time the maternal mortality in childbirth is approximately 0·5%. The maternal mortality after Cæsarean section appears to be about 10%, that is twenty times greater than the already high general death rate in childbirth. Dr. Jellett points out that when Cæsarean section is performed for contracted pelvis before the beginning of labour, the mortality is about 1·4%, while under the most unfavourable

conditions it may be as high as 50%. Whether the practitioner regards his duty from the humanitarian or from the national point of view, he cannot accept such a terrible risk unless all other modes of treatment are equally or more dangerous. Everyone is agreed that the operation may be required for contracted pelves, when the disproportion between the size of the fœtal head and the dimensions of the pelvis is considerable. For minor degrees of contraction Cæsarean section should not be entertained; there are safer methods of delivery. For border-line degrees of contraction pubiotomy or induction of labour some weeks before term in skilled hands will yield better results. The former method has so many advantages and is so rational that it is surprising that it is not resorted to more often. As far as contracted pelvis is concerned, it would seem that treatment by Cæsarean section under favourable conditions need not be attended by a high maternal mortality. The conditions precedent are that the diagnosis be made at an early date, that the patient be subjected to operation before the commencement of labour and before any internal examination is carried out and that it be performed in hospital by an experienced and skilled obstetrician.

Dr. Jellett adopts a wise course in refusing to accept either eclampsia or *placenta prævia* as an acceptable excuse for the operation. Dr. Wilson appears to hold similar if not quite such definite views. Although both these conditions are fraught with danger to both mother and child, the results of the more conservative measures are undoubtedly better when carried out by skilled practitioners. Moreover, preventive measures should remove the former and antenatal supervision should enable the obstetrician to overcome the risk of the latter. Cæsarean section may be needed for neoplasms, be they fibroid tumours, ovarian cysts or malignant growths. It is not certain that this operation represents the best means of terminating labour under these circumstances. Fibroids have frequently been removed without interrupting the pregnancy. Lastly it may be stated that Cæsarean section should very rarely be required for any other pathological condition.

The discussion at Dunedin, following many other discussions on the same subject, should serve to check the fashion of having recourse to so dangerous an expedient as Cæsarean section, save when it offers the best chances of recovery to both individuals concerned. The suggestion is made that every operation of this kind should be notified. We doubt whether notification would be a strong enough deterrent. The operation should be forbidden unless the patient has been removed to a properly equipped hospital, unless an experienced obstetrician is engaged to perform it and unless two medical practitioners have formed the opinion that its performance is in the best interests of the mother or her child or both. A general practitioner who performs Cæsarean section frequently, should be required to give an account of his work to some competent authority.

Current Comment.

CHOLECYSTOGRAPHY.

THERE are several important facts to be remembered when a new laboratory test or method of examination is introduced into the realm of clinical medicine. In the first place enthusiasm engendered by early successes may lead to too wide an application of the new discovery. In second place the findings may not be interpreted with a due regard to the necessary limitations. In the third place the enthusiast is unconsciously tempted to use the method to the exclusion of other well tried agencies and even to neglect what he can learn from clinical examination or what he has gathered in his past clinical experience. The average medical practitioner will readily agree with these statements; he may possibly regard them as platitudinous. It is unlikely, however, that he will admit the possibility of his own judgement being at fault. It is thus advisable to take stock, to temper enthusiasm with caution and to endeavour to gain a proper perspective.

At the meeting of the New South Wales Branch of the British Medical Association reported in this issue, attention was drawn to the widespread nature of gall bladder disease, to the fact that gall stone formation is but an incident in the pathological process and that removal of the gall stones or of the gall bladder itself is merely a part of the treatment. From this it naturally follows that early diagnosis may result in the prevention of gall stone formation, in checking the disease process and so in the elimination of surgical operation. Graham's test or examination of the gall bladder by what is known as cholecystography, has been used for a sufficient length of time to be regarded as of

the utmost value and as essential in a large number of cases. B. P. Anderson Stuart's paper on this subject is a clear and well considered statement and may be commended to the careful study of medical practitioners. Those who were fortunate enough to see his complete demonstration of skiagrams, will have no hesitation in believing what can be achieved by this agency. Unfortunately, the complete series could not be published at the present time and to have published merely a section would not have done justice to the work. Anderson Stuart's conclusions that gall stones can be diagnosed in 95% of cases, that gross changes will be recognized in 93% and that the general conclusions will be correct in regard to 90% of patients examined, agree with the figures of many other workers in this sphere. In the discussion at the meeting P. S. Parkinson made an important statement when he pointed out that the largest percentage of error will occur when normal findings are reported as a result of X ray examination. This was emphasized by J. V. Sparks at a recent discussion before the Royal Society of Medicine[1] and is worthy of further consideration. Sparks referred to the verified results of 3,357 cholecystographic examinations made at the Mayo Clinic between May and December, 1926. The figures had been supplied to him by B. R. Kirklin, of the Mayo Clinic. The drug used was tetrabromo-phenolphthalein and oral administration was adopted. Sparks first of all considered the figures from the point of view of findings at operation. A diseased gall bladder was found with stones at 219 operations. An X ray diagnosis of cholecystic disease had been made in 208 of these cases and the gall bladder had been reported as normal ("X ray negative") in eleven instances. The percentage of correct X ray diagnoses was thus 94·98. Definite disease of the gall bladder without stones was found in 105 cases, an X ray diagnosis of cholecystic disease had been made in 81 of these and no abnormality was found in 24. The percentage of correct X ray diagnoses was thus 77·14. Slight cholecystitis without stones was found in 15 cases, an X ray diagnosis of cholecystic disease had been made in eight of these and no abnormality was found in seven, the X ray diagnosis being correct in 46·66%. A normal gall bladder was found at exploration in 108 cases, an X ray diagnosis of cholecystic disease had been made in 36 of these and no abnormality was found in 72 cases. The X ray diagnosis was thus correct in 66·65%. When the figures were considered from the point of view of X ray signs the percentages were equally interesting. In 214 cases the gall bladder was invisible. In 146 cases a diseased gall bladder with stones was found, in 46 a diseased gall bladder was found, in six slight cholecystitis was found, in 16 the gall bladder was normal and the percentage of correct diagnoses was 92·51. In 119 X ray examination revealed faint shadows of the gall bladder. In 62 a diseased gall bladder with stones was found, in 35 a diseased gall bladder was found, in two slight cholecystitis was found and in 20 the gall bladder was normal. The percentage of correct diagnoses was 83·19. In 63 stone shadows were seen by X ray examination. In 60 cases a diseased gall bladder with stones was found, in one a diseased gall bladder was found, in one slight cholecystitis and in one a normal gall bladder. The percentage of correct diagnoses was 95·25. A diagnosis of normal gall bladder was made in 114 cases. In 11 a diseased gall bladder with stones was found, in 24 a diseased gall bladder was found, in seven slight cholecystitis and in 72 a normal gall bladder. The percentage of correct diagnoses was 63·15. It is seen from both these analyses that the greatest error always occurs with the apparently normal gall bladder. The percentage of error, moreover, is considerable. Sparks does not think that this percentage can be reduced if intravenous administration is adopted. Haenisch is quoted at the Royal Society of Medicine as stating that the percentage of correct X ray diagnoses of gall stones grows in proportion to the intensity of the interest, the more careful attention, the refinement of the technique, the study of the establishment of the diagnosis, the training of the eyes and the improvement which comes with constant use and experience. While this undoubtedly is true, it seems likely that with present day methods there will always be a considerable margin of error as far as the apparently normal gall bladders are concerned. It may be that errors will be eliminated to a greater degree with the elaboration of newer methods such as the discovery of a more suitable drug. In the meantime it must be recognized that the X ray findings in gall bladder disease are, as Anderson Stuart has stated, merely a link in the chain of evidence. No surgeon accepts the uncorroborated evidence of the barium enema in the diagnosis of bowel conditions. There is no reason why he should adopt a different attitude for the gall bladder.

[1] *Proceedings of the Royal Society of Medicine*, June, 1927.

PROPTOSIS OF THE EYE FOLLOWING TRAUMA.

THE cure of arterio-venous aneurysm in the orbit by ligature of the internal carotid artery must be a very rare event. Such a case is reported by St. J. D. Buxton.[1] The patient, a woman, aged forty-five years, was knocked down in the street on September 13, 1926. No abnormality was discovered. In October she complained of diplopia. In January, 1927, she complained of pain in the head. In February proptosis of the eye with slight pulsation was discovered. Surgical operation was undertaken and it was found that compression of the internal carotid artery eliminated a loud murmur which was audible over the frontal sinus. The artery was ligated. The proptosis gradually went down and eye movements and vision became normal. A temporary feeling of giddiness was the only symptom after operation. The case was reported a little more than two months after operation. In view of the length of time which was taken for the proptosis to appear, it is possibly too early to determine whether the improvement will be permanent. No mention is made of any radiological examination having been made.

[1] *Proceedings of the Royal Society of Medicine*, July, 1927.

Abstracts from Current Medical Literature.

PÆDIATRICS.

Intracranial Tumours of Pre-Adolescence.

H. CUSHING (*American Journal of Diseases of Children*, April, 1927) discusses the intracranial tumours of preadolescence. Tables are given with the object of comparing the incidence of tumours in childhood with that of tumours in the later years of life. The meningiomata and the acoustic tumours which together represent about 20% of all tumours, are essentially tumours of adult life. So are the pituitary adenomata which represent another 20%. Hence about 40% of all tumours are practically excluded from the list of those affecting children. Excluding these, three groups are left for consideration, a large number of gliomata, a small group of congenital tumours and a few tuberculomata. The relative preponderance of cerebellar over cerebral lesions in childhood is pronounced, the proportion being about two to one. The seat of predilection for tuberculomata is the cerebellum and the patients do better in the long run if operative interference is limited to decompression. The majority of the congenital tumours are suprasellar lesions arising from an *Anlage* of Rathke's pouch. They seriously interfere with the function of the pituitary body, producing definite constitutional symptoms. In about 80%, the walls of the cyst become calcified and cast shadows in the skiagram. They are more easily diagnosed than treated. Gliomata outweigh all other brain tumours in importance. They represent 75% of the tumours in childhood. The three largest groups of the gliomata are the spongioblastomata, the medulloblastomata and the astrocytomata. The spongioblastomata represent the highly malignant and rapidly growing gliomata of adult life and usually occur in the cerebrum. Less than 1% of these occur in childhood. The medulloblastomata are essentially tumours of childhood and usually occur in the mid-cerebellar region, arising from the roof of the fourth ventricle. These are not only rapidly growing tumours which tend to recur, but they commonly arise in the worst possible place to endanger life. The author estimates that the patients give on the average, a six months' preoperative history and will do well on the average for six months after operation. The astrocytomata which are of two types, fibrillary and protoplasmic, have a much better prognosis than the foregoing. They too most commonly arise from the roof of the fourth ventricle and therefore present much the same surgical problem as the medulloblastomata. Although it may be a desperate matter to remove them, the fact that the average survival period has been more than six years, speaks well of their benignity. Since they are nearly twice as common in childhood as medulloblastomata, there is a two to one chance of finding in the mid-cerebellar region of children a surgically favourable glioma, if methods can be perfected to deal with it. In the group of eighteen patients considered by the author, eleven were found at operation to have tumours of the cerebellum, while two awaiting operation probably also had subtentorial tumours. In seven of the eleven patients operated on the prognosis is excellent, five of the tumours being astrocytomata, one ependymyoma and one perithelioma.

Rickets and Radiation of Food Substances.

A. F. HESS (*Journal of the American Medical Association*, July 30, 1927) discusses the antirhachitic activity of irradiated cholesterol, ergosterol and allied substances. It has been shown that irradiated dried milk is of value not only in infantile rickets, but also in tetany. Hottinger found that such milk was more potent even than cod liver oil or its non-saponifiable fraction and that it produced results almost equivalent to those following direct radiation of the child. Dried milk which has been activated by irradiation, retains its antirhachitic power for a long time, in spite of conditions tending to destruction. The author finds that irradiated dried milk, kept in a cupboard under ordinary conditions for a period of half a year, loses but little of its antirhachitic power. Even after a year the activity was found to be only moderately reduced. In the early experiments the dried milk was exposed to the rays of the mercury quartz lamp for a period of half an hour at a distance of thirty centimetres (one foot). This intensity of radiation led at times to a peculiar alteration in the taste and odour of the milk. In order to avoid this, dried milk was subjected to a diminished intensity of radiation. It has been found that exposure for a period of two minutes at a distance of from twenty-five to thirty centimetres (ten to twelve inches) is quite sufficient to render it antirhachitic. Short irradiations have the further advantage of avoiding the destruction of the "fat soluble" and the antiscorbutic vitamins of milk. Cholesterol can also be activated by ultra-violet rays. It was shown that rickets in infants can be cured by the addition to the diet of a 3% suspension of cholesterol in olive oil. It subsequently appeared that 1·5% of cholesterol, given in teaspoonful doses three times a day brings about the healing process. Recently Hess has added irradiated cholesterol and cod liver oil to increase its antirhachitic value. He fortified the cod liver oil by the addition of 1% of irradiated cholesterol. Animal tests have shown that the potency of the cod liver oil is increased threefold. Irradiation of cod liver oil itself was found to render it slightly less potent. Its viscosity and surface tension were increased and its iodine number lowered. It seemed that the inactivity was brought about by the saturation of the sterol in the cod liver oil. Another means of giving activated cholesterol or an allied sterol was provided by feeding with irradiated brain. The brain contains more cholesterol than any organ in the body. The best method of preparing it is by drying the brain by means of a fan and then subjecting the powdered residue to the rays of a mercury vapour lamp. This preparation retains its potency for at least five months. It was found that healing rapidly occurred when one gramme daily of this preparation was given. Recently the question has been raised as to whether it is the cholesterol itself that is activated or some impurity intimately associated with it. When cholesterol has been purified, either by its recovery from the dibromide or by means of animal charcoal, it can no longer be activated. Windus and Hess prepared and tested a large series of preparations to ascertain if they could be rendered antirhachitic by irradiation. Of this series the only preparation that was specifically altered was ergosterol, prepared from yeast. Irradiated for one half hour at a distance of thirty centimetres, ergosterol was found to bring about healing of the bones in rhachitic rats when as little as 0·002 milligramme *per capita* was given daily. This infinitesimal amount is by far the smallest quantity of any vitamin that has been shown to possess curative powers. Activated ergosterol is five hundred times as potent as irradiated cholesterol. Irradiated dried yeast has been used in the treatment of rhachitic infants; 0·5 to 1·0 gramme doses were given every day suspended in milk. This preparation was readily taken and brought about a definite curative process. It is possible that ergosterol is the essential impurity in cholesterol and that activated ergosterol is the antirhachitic vitamin. It would seem more probable, however, that other unsaturated sterols will be discovered which can be rendered antirhachitic by ultra-violet rays, and that ergosterol is merely one member of this group.

Maternal Diet and Hæmorrhage in the New-Born.

C. U. MOORE AND J. L. BRODIE (*American Journal of Diseases of Children*, July, 1927) discuss the relation of maternal diet to hæmorrhage in the new-born. They describe experiments in which female rats were fed from the time of weaning on the minimum amount of Vitamin *B* necessary for normal growth and conception. None of the mothers showed signs of deficiency of vitamin, unless excessive hæmorrhage at delivery is considered an indication of this condition. With limited Vitamin *B* in the food of the mothers one of three conditions occur in the young. These are, abortions or absorption of the embryos, death of the young at birth or death during the nursing period. The deaths occurring at birth or during the first few days of life are characterized by hæmorrhages varying in

volume and position. A certain number of the animals dying during the second week, manifest, in addition, pronounced emaciation and myelin degeneration of the vagus and phrenic nerves. Occasionally, after the first stage of paralysis has developed, one or two out of a litter are strong enough to eat some of the mother's food and these usually recover. The amount of Vitamin *B* needed in the diet of laboratory animals to prevent deficiency in their nursing young is practically four times the amount apparently adequate for the normal growth and nutrition of the mother. The authors report a case of hæmorrhage of the new-born. The baby was born at home, but on account of the mother's severe hæmorrhage both mother and baby were transferred to hospital. The mother was a *multipara*, aged thirty-six, who had had seven previous normal deliveries. The family had formerly lived on a small farm, but had moved into the city eight months before the birth of the baby. The poverty of the family was extreme. The mother provided a diet largely composed of starches in the form of rice, rolled oats, potatoes and white bread. About twice a week they had a little boiled meat or sausage, some stewed fruit and a few carrots or cabbage. As there was never enough vegetable for all, the mother deprived herself of these. The family never had butter, eggs, fish, succulent vegetables, fresh fruit, whole grain cereals or whole-wheat bread. The labour was normal, but it was followed by severe hæmorrhage, the patient losing 1,000 cubic centimetres being removed to hospital. The baby's birth weight was 3,390 grammes. She was plump and normally active. From the third to the fifth days she had hæmaturia. On the fifth day the baby began to vomit and the abdomen became distended. The temperature rose to 39·5° C. (103·2° F.). The baby died that night. At the *post mortem* examination a large amount of fluid and clotted blood was found in the abdominal cavity. Ruptured subcapsular hæmorrhages of the right kidney and right suprarenal seemed to be the points of origin of the extravasated blood. Both kidneys manifested subcapsular, cortical and medullary hæmorrhages. On examination of a number of nerves taken from the lumbar plexus myelin degeneration from the early to the more advanced stages was found. The authors conclude that this case of hæmorrhage of the newly-born presents the pathological evidences of beri beri, due to the deficiency of Vitamin *B* in the mother's diet during pregnancy.

ORTHOPÆDIC SURGERY.

Fractures of the Ankle Joint and of the Lower End of the Tibia and Fibula.

AFTER deploring the lack of interest and teaching in the treatment of fractures generally Edgar Lorrington Gilcreest (*The Journal of the American Medical Association*, January 22, 1927) enumerates basic principles of treatment of fractures of the ankle joint and of the lower end of the tibia and fibula. The main fragments of the tibia should remain parallel and the horizontal and parallel portions of the flat weight-bearing surfaces of the tibia and astragalus should be maintained. Slight lateral displacement is quite compatible with perfect ultimate function. Traction should not be spared. It is seldom overdone. No matter what method of treatment is used, the foot should almost always be held at a right angle to the leg. Immediate reduction under anæsthesia should be carried out. These conditions should be regarded as acute emergencies and no time should be lost. Reduction and the application of plaster suffice for the majority. It is folly to wait for swelling to subside. If adequate reduction cannot be obtained, open operation should be performed without delay; direct traction may be necessary.

Bilateral Lumbar Sympathetic Ganglionectomy and Ramisection for Polyarthritis of the Lower Extremities.

LEONARD G. ROWNTREE AND ALBERT W. ADSON (*The Journal of the American Medical Association*, March 5, 1927) have attempted a new form of treatment in a case of non-specific rheumatoid arthritis. Most of the old forms of treatment of the disease aimed at increasing the circulation and temperature of the joint or extremity. The results obtained by lumbar ramisection in other diseases suggested that the vasomotor disturbances, indicated by the cold and clammy feet of a patient suffering from chronic arthritis, could be beneficially affected. The patient presented had suffered from generalized chronic arthritis for six years and had finally become incapacitated for work. Her joints were especially stiff and sore in the morning and she had increasing difficulty in moving. Pain was a prominent symptom over the metatarsal arch and the wrists, elbows and knees. The hands were cold and clammy. Trophic changes were pronounced, the flesh soft and yielding and the skin smooth and glossy and covered with a fine film of moisture. In addition the feet showed patches of cyanotic tint when in the dependent position. Bunions and flat feet contributed to the deformity. Puffiness was striking over the dorsum of the feet and about the ankles the tissues felt boggy. There was approximately 25% limitation of the movement of the ankles and the X ray examination yielded evidence of destructive arthritis in both wrists and periarticular arthritis in the phalangeal joints. The spine and hip were unaffected. A bilateral sympathetic ganglionectomy and ramisection were performed through a midline incision, the sympathetic trunks from the second ganglion to the fourth being removed. Since the operation the patient's feet have been dry and of a normal pink colour. The skin has desquamated and the trophic changes have largely disappeared. The distal portions of the nails are still of a "trophic" type, while a zone of apparently normal nail has appeared proximally. Pain has entirely disappeared and has been replaced by a pleasant sensation of warmth. Heat radiation has increased 300% to 450% in the feet, while the temperature has increased about 8° C. as a result of operation. A great improvement in walking has occurred, so much so that the patient has requested cervical operation for the relief of the condition of the arms and shoulders.

Paralysis of the Gluteus Maximus Muscle.

AN operation for the relief of paralysis of the *gluteus maximus* muscle is offered by Frank R. Ober (*The Journal of the American Medical Association*, April 2, 1927). The operation is similar to the operations of Lange and Kreuscher, but instead of silk a strip of *fascia lata* is employed to join the freed end of the *sacro-spinalis* to the region of the trochanter. Details of the operation are given and the author has applied his technique in fourteen cases. The paper is illustrated with drawings of the operation and with a photograph showing the effect of treatment in a patient.

Extraarticular Fusion of the Sacro-Iliac Joint.

WILLIS C. CAMPBELL (*Surgery, Gynecology and Obstetrics*, August, 1927) introduces a simple operation, entirely extraarticular, for fusion of the sacro-iliac joint. The object of the procedure is to fuse or induce osseous union between the overhanging portion of the ilium and the posterior portion of the sacrum. This avoids the possibility of entering the sacro-iliac joint. The technique is as follows: An incision is made along the outer lip of the crest of the ilium from the posterior one half to the posterior inferior spinous process. This is carried down to the bone where the periosteum is exposed and excised for a considerable distance and the posterior portion of the dorsum of the ilium is exposed. The crest of the ilium is dissected free to raw bone and the adjacent fibrous tissue is removed from the posterior surface of the sacrum beneath the *sacro-spinalis* muscle. A portion of the crest is removed and placed in a towel. The inner surface of the overhanging portion of the crest of the ilium is denuded and a raw gutter made parallel to the sacro-iliac joint. This gutter is formed by the posterior surface of the sacrum and the inner surface of the ilium posterior to the sacro-iliac joint. The graft is placed in this space. Multiple grafts are also placed in this gutter until the space is well filled. Other details are given. The method has been used in seven cases to the present time; in five the results are apparently satisfactory. In two cases sufficient time has not elapsed to determine the effects of the procedure.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SOUTH AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Darling Building, University of Adelaide, on July 28, 1927, DR. R. H. PULLEINE, the President, in the chair.

Inflammations of the Colon.

DR. F. S. HONE read a paper entitled: "Inflammations of the Colon" (see page 426).

DR. C. T. CH. DE CRESPIGNY referred to the importance of a careful examination of the stools in cases of diarrhœa in which the dejecta contained mucus and blood. In the last six years he had had under his care three patients who had contracted amœbic dysentery in South Australia. One of these had lost a sister and mother from "diarrhœa" of nine months' duration and although no bacteriological diagnosis had been made, it was probable that they had also suffered from amœbic dysentery. The three patients referred to had come from Port Pirie, Crystal Brook and Quorn. There was no evidence to show that the infection had been brought by a carrier from abroad and none of the three had lived outside the State of South Australia.

The general appearance of the stools in bacillary dysentery and amœbic dysentery differed. Bacteriological examination of the stools in bacillary dysentery seldom gave a culture of the infecting *Bacillus dysenteriæ* after the first three days of the illness.

Diagnosis had also to be made from other forms of chronic diarrhœa; carcinoma of the rectum and pelvic colon and splenic flexure might cause diarrhœa with mucus and bloody dejecta. The diarrhœa of achlorhydria should also be borne in mind. This form might be hereditary. Dr. de Crespigny had lately had under his care an unmarried woman of thirty-five years of age, who had suffered from diarrhœa causing six or seven motions daily for the previous twelve years. Examination of the stool had not enabled a diagnosis of the cause to be made, but a fractional test meal, carried out by Dr. Ray Hone, had revealed complete absence of hydrochloric acid. The patient had been promptly cured of her diarrhœa by four mils of dilute hydrochloric acid well diluted with water taken with each meal. Her father and paternal uncle also suffered from chronic diarrhœa. Graves's disease in one of its *formes frustes* might be a cause of chronic diarrhœa. In such a case the thyreoid might not be notably enlarged. In the case of an elderly man who had suffered from chronic diarrhœa for years, the condition had been cured by partial thyreoidectomy. The thyreoid had been only slightly enlarged. Fine tremor of the hands and moderate tachycardia had been the only other symptoms of Graves's disease present in this case.

In two cases observed by Dr. de Crespigny the onset of the attack had been accompanied by rather profuse hæmorrhage from the bowel. In regard to the identity of ulcerative colitis and bacillary dysentery he was not certain that such was the case. In acute ulcerative colitis the pyrexia usually persisted, whereas in acute bacillary dysentery in so far as his rather extensive experience in the Third Australian General Hospital at Lemnos went, the pyrexia usually subsided in a few days even in very severe cases with rising pulse rate and eventual death in from ten to fifteen days. Further in patients suffering from bacillary dysentery who survived after the initial acute symptoms, the disease usually ended in cure and not in chronic ulcerative colitis. Acute ulcerative colitis as it was seen in this country might terminate in (i) complete recovery, (ii) death, (iii) a chronic ulcerative colitis. Recovery might be about complete and then be succeeded by a series of exacerbations occurring at intervals of months or years. Possibly some previously unidentified species of dysentery bacillus or a modified strain of one already known might be responsible for these cases. Also it was to be remembered that sporadic cases of an infectious disease tended to behave atypically.

Occasionally very slight cases were met with in which the patient had recurrent attacks of diarrhœa with mucus and blood which soon passed off. In regard to treatment it was found in the Gallipoli compaign that serum seemed beneficial, if given in large doses during the first three days. When begun subsequently during the illness, it was useless. Sodium sulphate was always given in three to four gramme doses every four hours and was of great use in acute dysentery. In ulcerative colitis treatment was not very satisfactory. Such cases were always grave. In the very acute stages irrigation was probably harmful and very trying to the patient. Later very dilute potassium permanganate was believed valuable. It might be used in 1: 10,000 solution and the patient induced to hold half a pint in the bowel for as long as he could. A petreleum emulsion, such as Angier's, had been of value. Diet should be liberal, only those substances which left an unabsorbed residue, should be avoided. In regard to operative treatment he had not been happy in his experience of caecostomy or appendicostomy with the exception of one remarkable case for the notes of which he was indebted to Dr. Bronte Smeaton. In this patient, a girl, aged nine years, ulcerative colitis of considerable and progressive severity had been present for more than six months and had been adequately treated medically by Dr. Tobin, of Gawler. Finally operation had been decided upon and as the appendix had already been removed, Dr. Smeaton had performed caecostomy. Colonic irrigation had been carried out through the stoma and in six weeks all blood and mucus had disappeared. A recurrence had occured three or four weeks after the patient left hospital and this had been at once relieved by irrigation through the still open stoma. It was noted during treatment by Dr. Smeaton that although three pints of fluid could be instilled into the rectum *per anum*, none even flowed out through the opening in the caecum. This seemed to be an argument in favour of appendicostomy or caecostomy if it was suspected that the caecum and ascending colon were extensively ulcerated. This patient at the time of the meeting was a strong healthy girl of seventeen years, although some two years after her attack of ulcerative colitis she had had to be hurriedly operated upon for acute obstruction from adhesions about the caecum. At this operation it had been noted that the wall of the ceacum was somewhat thickened.

DR. FRANK BEARE said that, although he had been asked to say something about inflammatory conditions of the colon in children, he thought the subject too big to be dealt with completely in the time available, so would limit his remarks to the most common of such diseases, dysentery. Like Dr. Hone, he thought that the term "dysentery" should be confined to the condition which was characterized by the passage of blood and mucus in frequent motions of the bowels.

Dysentery in children in Australia was practically always of the bacillary variety. The organism described by Flexner was the one most commonly found. Shiga's organism was only occasionally found while the bacillus described by Sonne, of Copenhagen, had been from time to time isolated in Melbourne and Adelaide. In addition to the above-mentioned, Webster and Williams, of Melbourne, had described a mixed group of "dysentery-like bacilli" obtained from the stools of children suffering from "dysentery." Although emulsions of these organisms were not agglutinated by the serum of the children from whose stools they were cultivated, it should be remembered that in *Bacillus flexner* infections, as in typhoid group infections, the above change was not obtained until a certain time had elapsed from the onset of the illness. He thought that this indefinite group of organisms would repay more intensive investigation.

Although dysentery occurred more commonly during the summer months, it was quite frequent in winter. For this reason he deprecated the use of the term "summer diarrhœa" which implied that it was a summer disease, but this was not altogether true. Children over the age of twelve months were more liable to the complaint than infants, a large proportion of whom were breast-fed. It was well established that infants entirely breast-fed were less likely to contract the disease than those artificially fed. Bacillary dysentery in Adelaide was widespread

throughout the community and not limited to children. Many attacks in adults passed unrecognized; for, while an attack in the former was more or less trivial, it was always a serious matter in a child.

Post mortem the main pathological changes were found in the colon. Briefly, they consisted of ulceration of the mucosa and sometimes deeper layers of that region. The ulcers varied in size from a pin point to a sixpenny piece, their edges were not undermined, but had a tendency to be rolled outwards. The commonest site was on a lymphoid follicle. The floor of the ulcer might consist of a layer as deep as the serous coat and on one occasion he had found a perforation through this layer which he considered to be most uncommon. For practical purposes he considered that all cases of diarrhœa characterized by the passage of blood and mucus stools should be treated as bacillary dysentery until proved to be otherwise.

While brilliant results had been obtained in adults infected by Shiga bacillus after the use of anti-Shiga serum, the results of serotherapy in cases of Flexner infections in children had been disappointing. Nevertheless he thought that there was need for more work along the line of serotherapy in Flexner and other infections. The best results would always be obtained when the serum was used early in the course of the illness and when it was used in large doses and repeated if necessary. It was not just to condemn the use of serum when it was employed late in the course of the disease or when it was used in minute doses. The serum when used in a series of thirty-one cases in Adelaide had given promising results, but that was all that could be said for it. In America investigators had not been satisfied with their results from its use, while in Melbourne Webster and in Sydney Little and Ross had obtained fairly satisfactory results. He had seen no record of its use in children in England or the Continent.

He did not think that very much was being done along preventive lines as far as dysentery was concerned. Although there was little doubt as to how dysentery was spread it was not yet quite settled where the reservoir of the infection lay. There were some authorities that doubted the existence of a "carrier" state in this disease.

Fletcher and MacKinnon in Medical Research Committee Publication Number 29, of 1918, had shown that many convalescents from Flexner type dysentery harboured the organisms for a very long time in their stools. Further Flexner bacillus harbourers were on the whole quite healthy individuals, thus differing from Shiga harbourers who were invalids. They also found that the motions of these Flexner harbourers were apparently quite normal. They pointed out that in these individuals the Flexner bacilli were not constantly present in the stools, but were found only intermittently. Thus in one case quoted by these observers twenty-six successive daily examinations had yielded no organisms; in the twenty-seventh to the thirty-first organisms had been found; the thirty-second to the forty-sixth had again yielded no organisms and in the forty-seventh organisms had been found. Dr. Beare said that in 1922 he had published a personal observation that was perhaps worth repeating.

Mr. E. had contracted bacillary dysentery on Gallipoli in 1915. He had been in hospital at Malta for forty weeks and had then been invalided to Australia and discharged from the army as unfit. Soon after this he had married. His wife soon after this event had had dysentery with the passage of blood and mucus in the stools. In 1920 his child, aged two years, had had "colitis" with bloodstained motions. Both he and his wife had continued to have attacks of diarrhœa. In 1922 twins, aged three months, had suffered from diarrhœa with the passage of blood and mucus. One had died and at autopsy dysenteric ulceration of the colon had been found. Just prior to the death of the twin, a stool examination from the father, who had not had diarrhœa for some three months, had manifested *Bacillus dysenteriæ* (Flexner) after the administration of a saline purge.

Dr. Beare thought that there were many persons at large in the community who, although in apparent good health, harboured dysentery organisms in their colons and that these people infected children to whom dysentery was a serious complaint.

The problem of the sufferer from intermittent attacks of dysentery had worried the authorities for some time. Perhaps the use of serum, as detailed by Dr. Hone, would clear up the infections. At any rate it was worth trying.

Dr. Beare said that it would perhaps seem that he had been talking about adults and not children. Nevertheless, he thought that to prevent dysentery in children, the attack would have to be made on the adults who carried the organisms in their colons.

DR. J. CORBIN said that the surgical conditions which might simulate dysentery or colitis, were: (i) hæmorrhoids, (ii) carcinoma of the rectum, caecum or sigmoid, (iii) chronic intussusception, (iv) tuberculous peritonitis. Careful investigation by digital examination, aided by the sigmoidoscope and later, if necessary, by opaque enemata and X rays, would serve to exclude these. In any case of chronic colitis or dysentery it would be an ordinary precaution to have repeated examinations of the stools made in order to exclude the presence of amœbæ or bacterial infection. In old-standing cases this was particularly necessary, as there was always a risk of rupture of an ulcerated or thinned portion of the gut during an examination with the sigmoidoscope. Dysentery typhilitis, amœbic in origin, was not an infrequent complication in tropical countries and a perforating or leaking ulcer, due to amœbic infection, might occur commonly in the region of the caecum and be regarded as an ordinary attack of appendicitis. The diagnosis could be made only by an examination of the pus or fæces. This condition was not likely to be encountered in Australia. The treatment in any case would be the same, with the exception that healing would be more rapid if emetine were administered at the time. The other surgical conditions that might call for treatment arising from amœbic dysentery, were perforation of a thinned or ulcerated portion of the bowel with peritonitis and amœbic abscess of the liver or perinephritic abscess.

The most common sites of perforation were the caecum and the sigmoid. The perforation might be sudden owing to the separation of a large slough and be followed by flooding of the peritoneum with fæcal material. In these circumstances the issue would probably be rapidly fatal. At other times the erosion was slower and there was time for the formation of adhesions of omentum or of some other portion of the bowel. In these circumstances an abscess formed and this called for surgical treatment which varied with the condition of the patient.

The surgical proceedings that might be necessary apart from dealing with the aforementioned complications, were those undertaken for the purpose of treatment of the primary dysenteric conditions. They were appendicectomy, appendicostomy, valvular caecostomy, open caecostomy and enterostomy. In referring to appendicostomy, Dr. Corbin said that a certain number of patients, under treatment at the Repatriation Hospital with emetine, had had periods of complete relief of symptoms followed by recurrence at intervals. Two of these patients had complained of pain in the right iliac region at the onset of the recurrences and they had complained of pain on pressure over the region of the appendix. Removal of a thickened appendix in both instances had afforded relief and in neither case had the remaining dysenteric condition been of a severe character.

Appendicostomy was the easiest operation to perform, if it was intended to wash out the large bowel. The incision was made as for an ordinary appendicectomy. The appendix was then brought out of the wound and fixed to the parietal peritoneum and the skin edge. The distal portion was removed and a Jacques rubber catheter was sutured into the opening. Lavage of the large bowel could be continued through this for as long as might be considered necessary. When the condition had subsided, it was not difficult to close the remaining aperture.

Valvular caecostomy was performed for the same purposes and was done when it was difficult or impossible to make satisfactory use of the appendix. A portion of the caecum was pulled out and a purse string suture was placed in position. A Jacques catheter was sewn into an incision made in the apex of the portion of the caecum which had been pulled out, and this was then pushed in and the purse string suture tied. The caecum was fixed to the parietal peritoneum and the wound closed.

Open caecostomy was performed for the purpose of diverting the bowel content from the inflamed large bowel. Lavage could be carried out through this as well.

Enterostomy might be performed when the caecum was extensively diseased. In this the ileum was divided about fifteen centimetres (six inches) from the caecum and the proximal end was brought out through the abdominal wall. Probably in such a case caecostomy would have been performed earlier and lavage could be carried out through that opening. When the condition had improved, a lateral anastomosis could be performed between the small intestine and the ascending or transverse colon with closure of the enterostomy wound. Dr. Corbin went on to say that this personal experience had been confined to the use of appendicostomy as a treatment of this condition, with the exception of the two cases of appendicectomy to which he had already referred. In both these instances there had been a definite improvement in the dysenteric condition and in the patients' general condition. The infection in each instance had been bacillary and not amœbic. His feeling was that in an acute case he would prefer to do an open caecostomy, as by this means the double relief of drainage and lavage was obtained. For milder or more chronic conditions an appendicostomy was probably the best treatment from a surgical point of view.

DR. I. B. JOSE reported a case of long standing ulcerative colitis, confirmed by sigmoidoscopic examination. The onset of the illness had taken place four years previously with attacks of diarrhœa of gradually increasing duration with blood, pus and mucus in the stools. Two years later appendicostomy had been performed; the colon had been irrigated with various solutions once or twice a day ever since, without any definite influence on the disease, and the patient had had anything from ten to twenty bowel actions in twenty-four hours, with the loss of large quantities of blood.

At this stage she had come under Dr. Jose's observation. She had been given, intravenously, antidysenteric serum, thirty, sixty, ninety, ninety, ninety cubic centimetres on successive days. This had been followed by a pronounced serum reaction with rigors and skin eruptions *et cetera* eight days after the first injection. The bowel actions had suddenly diminished to one or two in twenty-four hours and bleeding had ceased.

For the following four months and up to the time of the meeting she had been kept in bed on a diet and colon lavage with hypertonic saline solution had been used. She had kept up the improvement in her local condition and her general appearance had greatly improved, though sigmoidoscopic examination had shown that ulceration was still present.

Dr. Jose said that he had reported this case to add to Dr. Hone's series of patients treated in a similar way. He considered that the benefit derived in his case would be difficult to ascribe to anything but reaction to the "non-specific" protein shock from the injections.

DR. O. MOULDEN reported the following four cases illustrative of some of the conditions under discussion.

The first case was that of a male, aged sixty-three years. When first seen he had stated that for two months he had been passing blood and slime in his motions. He had been having ten to twelve stools daily. There had been no abdominal pain, but considerable tenesmus. He had been treated medically for a month without ceasing work and had then taken a holiday for two weeks without any definite improvement. He had up till this time lost 9·4 kilograms (one and a half stone) in weight.

No mass had been felt in the abdomen and rectal digital examination had revealed no abnormality. Examination by the sigmoidoscope and barium enema X ray examination of the whole colon had revealed no abnormality. Microscopical and cultural methods of examination of the stools had revealed no amœbæ or cysts and no *Bacillus dysenteriæ*, but pus and blood cells were found. Owing to continued loss of weight, exploration had been decided on, malignant disease being suspected, in spite of normal X ray findings. On opening the abdomen there had been no definite abnormality found, perhaps some thickening of the descending colon only. The abdomen had been closed and appendicostomy perfomed. On the third day after operation irrigation of the colon had been instituted. A litre of saline solution had been run through twice daily for two weeks. In a fortnight all blood, pus and mucus had ceased and the stools had become normal in number. He had gained weight rapidly and in two months from the time of operation he had regained his normal weight of 53·5 kilograms (eight stone seven pounds). The case was of interest as illustrating the successful treatment of ulcerative colitis by appendicostomy with colonic lavage with normal saline solution.

The following three cases were reported to illustrate varying degrees of acuteness of diverticulitis of the pelvic colon.

The first case was that of a male, forty-seven years of age. His history was that when sixteen years old he had had an attack of pain in the lower abdomen which lasted fourteen days and was severe enough to keep him in bed during that time. There had been constipation for the first four days. He had had another attack of a similar nature eight years previously and had been in hospital under observation for fourteen days. A third attack three years previously had been very similar to the others. It was during the fourth attack that he had been first seen by Dr. Moulden. He had been ill for two weeks with pain of fairly severe degree in the lower part of the abdomen on the left side. He had been constipated for the first few days of the attack. There had been a good deal of deep-seated bearing down. The pain had gradually improved, but was still present.

On examination of the abdomen no mass had been felt. On rectal digital examination there had been an indefinite tender mass which could be touched with the finger tip. He had been given paraffin oil in large doses and had been completely free of trouble in a week.

A barium enema X ray examination had revealed a condition of diverticulosis of the pelvic colon. Three radiograms taken at intervals eliminated the condition being that of spasm.

It would appear that his recurrent attacks were of the nature of subacute diverticulitis originating in one of several diverticula existent in the pelvic colon. This subject had suffered from chronic constipation for many years.

The next case was that of a male, sixty-seven years of age. He had never had constipation of any severe degree. Whilst driving in his trap he had suddenly experienced pain in the lower part of the abdomen. The pain had become intense and he had not been able to lie down, but had had to sit in a chair. Eructation of gas by the mouth had not relieved the pain. The pain had persisted for two hours. Three hours later the pain had again become very acute. He had vomited a little once and when he had first been seen by Dr. Moulden at this time he was on his hands and knees on the bed in severe pain.

The abdomen had been moderately distended and tender in the lower left quadrant. Rectal digital examination had revealed no definite abnormality. He had been given morphine hypodermically and castor oil. He had been relieved of pain and in a few hours had slept. His bowels had acted normally. He had remained fairly well and free from pain, but with some distension for four days when he had again experienced an acute pain in the left lower part of the abdomen. He had said that he felt as if he was going to burst. A provisional diagnosis of volvulus of the pelvic colon had been made and laparotomy was performed.

The peritoneal cavity had been full of pus. The usual sites of trouble in such acute conditions of the abdomen had been explored without any abnormality being found. The pelvic colon, however, had been found more or less shut off by adhesions and surrounded by thick pus. For a length of about fifteen centimetres (six inches) it had been greatly thickened and indurated. No perforation had been seen. The whole colon had been more or less bound down and not suitable for an easy colostomy, so ileostomy had been performed, a loop of ileum about 22·5 centimetres (nine inches) from the ileo-caecal valve being withdrawn and opened later. The patient had survived. Six days later a barium enema X ray examination had revealed a stricture of the pelvic colon and diverticulosis, the diver-

ticula being up to 2·5 centimetres (one inch) in length. The patient had gradually lost weight. Two months later a further X ray examination had revealed a considerable lessening of the stricture, doubtless due to subsidence of the inflammatory thickening of the pelvic colon. The ileostomy had been resected and a colostomy performed a little to the left of the middle of the transverse colon. The small bowel union had, however, broken down and a fæcal fistula persisted. He had continued to lost weight—25 to 31·5 kilograms (four to five stone)—when a further and successful attempt had been made to close the fæcal fistula. A barium enema X ray examination at this stage had revealed a further considerable lessening of the stricture of the colon. The patient had been fitted with a colostomy cap with rubber bag attached. He had made a good recovery. He was very well with his colostomy. He was so well that he refused to entertain the idea of resection of his diseased pelvic colon.

It was thought that this case illustrated the condition of acute diverticulitis commencing in one of the numerous diverticula of the pelvic colon.

The next was that of a male, forty-one years of age. He had been suddenly attacked in the middle of the night with shivers and a severe painful bearing down sensation in the lower part of the abdomen. He had vomited several times. When seen five hours later he had complained of severe pain in the lower part of the abdomen and vomiting.

Rectal digital examination had revealed general tenderness. The abdomen had been opened and the peritoneal cavity found full of pus. None of the usual causes of an acutely inflamed abdomen had been found. The pelvic colon had been found to be greatly thickened and infiltrated for a length of about fifteen centimetres (six inches) in its distal portion. No perforation had been seen. As the bowels had been well opened by enema prior to operation it had not been thought necessary to perform colostomy. The abdomen had been closed and drainage tubes inserted. The patient had died nine hours after operation.

The condition appeared to be one of hyperacute diverticulitis of the pelvic colon. The appearance of the pelvic colon had been very similar to that found in the preceding case.

Syringomyelia.

DR. E. BRITTEN JONES showed a youth, aged seventeen years, who was suffering from syringomyelia. The thermo-anæsthesia and hyperalgesia were of the "sleeve and jacket" type. One hand manifested the trophic disturbance described by Charcot as *main succulent* and this hand been the site of painless whitlows and other septic infections, the condition formerly described as Morvan's disease. The motor disturbance was confined to the muscles acting on the spine with a resulting kypho-scoliosis of the upper dorsal region which had been present since the patient was four years of age.

Adeno-Carcinoma of the Pituitary.

DR. R. H. PULLEINE reported a case of adeno-carcinoma of the pituitary.

Skiagrams.

DR. H. C. NOTT showed a series of skiagrams depicting various lesions of the colon.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on July 28, 1927, DR. F. BROWN CRAIG, the Acting President, in the chair.

Gall Bladder Disease.

DR. H. R. G. POATE read a paper entitled: "The Surgical Gall Bladder" (see page 433).

DR. ALAN S. WALKER read a paper entitled: "The Medical Treatment of Gall Bladder Disease" (see page 431).

DR. B. P. ANDERSON STUART read a paper entitled: "Cholecystography" (see page 436). He illustrated his remarks by a series of skiagrams.

DR. H. SKIPTON STACY congratulated the authors on the way in which they had presented their subjects. He had been interested in cholecystitis for years. As Dr. Poate had said, the symptomatology was often obscure. The initial signs of cholecystitis were often overlooked. In bygone days they had been taught to look for gall stones, but gall stones were only the terminal event. In some cases a change of colour of the gall bladder and the presence of adhesions were the only indication of trouble, but they were diagnostic signs. Dr. Stacy pointed out that these were signs of inflammation and in most cases of adhesions of gall bladder to surrounding structures the primary lesion was situated in the gall bladder. Often confusion arose in the diagnosis between appendicitis and cholecystitis; the patient was lucky if the surgeon, in operating, made his incision over the gall bladder, for a slight extension usually allowed the appendix to be removed, whereas it was not possible satisfactorily to judge the condition of the gall bladder by mere palpation from an appendicectomy incision. In this connexion he did not quite agree with Dr. Poate, for he maintained that it was necessary to look at the gall bladder. He recalled the case of a patient who had had supraorbital pain amongst other symptoms for years; this had been cured by the chelecystectomy. Often the symptoms were due to associated alimentary sepsis and indeed cholecystitis was frequently due to alimentary sepsis. Dr. Stacy held that the general practitioner often saw the condition in better perspective than the surgeon; they saw that the patients did not necessarily get rid of all their symptoms after operation. Some dyspepsia, resulting from hypochlorhydria, often persisted. As Dr. Walker had said, hydrochloric acid might be of use.

Moynihan never closed a cholecystectomy wound without inserting a tube down to the stump of the cystic duct. On the other hand Sir Alexander MacCormick rarely used a drain. The insertion of a drainage tube might give rise to adhesions. He found that adhesions were not uncommon after operation and that they caused pain that might persist.

DR. J. COLVIN STOREY, O.B.E., congratulated the speakers and expressed his admiration of the pictures shown by Dr. Anderson Stuart. He was rather dismayed. If they followed Dr. Poate's advice, half of those present on suffering from an attack of indigestion would have to be operated upon, while if they followed Dr. Walker's advice, a duodenal tube would be passed. He thought that both procedures might be a little unnecessary. Many of them suffered from slight inflammation of the gall bladder. If they were left alone, it would be best. It should be remembered that operations on the gall bladder might be extraordinarily difficult, even to experienced surgeons. An operator never knew what he would find, until the abdomen had been opened. While working in the Anatomy Department, he had been struck by the frequency with which he encountered variations in the blood supply. He had often seen a large vessel arising from the superior mesenteric artery in unusual relation to the common bile duct. On one occasion he had actually tied this vessel and had been dismayed to find that he had cut off the blood supply to the right lobe of the liver; fortunately no untoward effects were noted. Cholecystectomy might be an ideal operation. At the same time it was the duty of the surgeon to know that the common duct was patent before he removed the gall bladder. If a surgeon were not experienced in this type of surgery, he had better leave cholecystectomy alone. Certain rules were laid down in regard to the way in which the gall bladder should be attacked, but Dr. Storey thought that this was a mistake. It was necessary to cut the coat according to the cloth. In removing the gall bladder great care had to be taken not to clamp the common duct just above the junction with the cystic duct. This might actually occur if the cystic duct were clamped blindly. He was convinced that in the dear old obese ladies with inflamed gall bladders it was advisable to do as little as possible—to remove stones and to drain the gall bladder. On more than one occasion he had seen a drainage tube cut in halves by a needle passing through it. To obviate this possibility it was his custom to fasten the tube by a clove hitch. He did not think that Dr. Stacy was quite correct when he stated that Sir Alexander Mac-

Cormick seldom used drainage tubes. Dr. Storey had worked with Sir Alexander for some time as his assistant and he had always seen him put a rubber tube from the loin down to the common duct. In regard to the use of bougies in the common duct he followed Sir Alexander MacCormick in using them in order to make quite sure that the bile would run as Nature had intended that it should.

DR. G. H. ABBOTT said that there was some difference of opinion as to whether or not drainage should be used after cholecystectomy. He thought that no definite rule could be laid down and that every case had to be judged on its merits. The condition of the common duct should be taken into consideration. If the gall bladder was free and it was removed without soiling of the peritoneum, no drain need be inserted. If, however, some oozing occurred from the raw surface of the liver and if the peritoneum were soiled, it was advisable to drain through a stab wound in the side. He agreed with Dr. Storey that dilatation of the common duct with bougies should be carried out. Years previously it had been his practice to place a tube in the common duct, but he had not been satisfied with the results. Since dilating the common duct and stitching it up he had had no trouble.

DR. L. R. PARKER congratulated the speakers and referred in glowing terms to Dr. Anderson Stuart's skiagrams and paper. He referred to a patient whom he had seen with Dr. Edye concerning whose condition the radiographic diagnosis seemed to have been misleading. Although a bladder full of stones had been diagnosed, none had been found at the operation. He had no explanations to offer. In connexion with Dr. Stacy's remarks about surgeons not seeing enough of their patients after operations on the gall bladder he could endorse the fact that trouble did arise not infrequently from postoperative adhesions. In one patient the attack of gall stone colic previous to operation had kept her in bed for from two to three days. After operation she had been compelled to stay in bed for from two to three months on account of the pain caused by adhesions.

DR. K. SMITH, C.M.G., said that he spoke as one who had not been in active general practice for some years, but had often been in the position of sitting in judgement on the diagnoses of others. At the Repatriation Department many cases of neurasthenia had been dealt with and the experience was that in at least 90% there was a definite organic basis, usually an infection. It seemed that each bacterium had its own specific effect, one would cause cholecystitis, another appendicitis. It was no use dealing with the cholecystitis alone, the cause must be discovered. Recently one man had been much upset at an apparently cursory examination by Dr. Poate who had diagnosed biliary colic after reading the history taken by the departmental medical officer and shortly questioning the man. The diagnosis was correct, but the colic was only an incident in an infection starting four years previously. He went on to refer to the need for post-graduate study.

Dr. Poate had mentioned myocarditis as a symptom of cholecystitis, but how was it possible to diagnose the presence of early myocarditis? It was to be regretted that none of the great teaching hospitals or the University possessed an electrocardiograph, the instrument of proved value in the detection of early myocardial involvement.

DR. ARCHIE ASPINALL congratulated the speakers on their excellent papers and expressed gratification that these papers had stimulated a good discussion. Dr. Poate had summed up the arguments for the removal of the gall bladder. He wished to consider which was actually the best operation. If conditions were favourable he removed the gall bladder, but when house surgeons asked him what operation they should undertake, for example in the country, he advised them that it was safer to drain the gall bladder. It was said that patients frequently returned for a second operation after drainage or that malignant disease might supervene, but as a result of his twenty years' experience at Sydney Hospital, he thought that this was not the case. It was claimed that the mortality after cholecystectomy was negligible. It should be emphasized that this was true only if the operation were performed by a skilled surgeon.

He was interested to hear from Dr. Poate that he used the paramedian incision. He (Dr. Aspinall) used Kocher's incision. He had found that this incision rendered it easier to stitch the abdominal wall of fat people at the end of the operation. It was necessary to be careful when using this incision because when the liver was pulled up, the common duct and the cystic duct lay in the same straight line. He always inserted a drainage tube, although at the time there might appear to be little need for it. On occasions bile was seen to be oozing from the liver; in these circumstances it might be necessary to reopen the wound at a later date.

In conclusion Dr. Aspinall pleaded for team work in connexion with gall bladder disease. He thought that if the physicians could find time to attend the operations on their patients and to meet their surgical colleagues in the theatre, it would be greatly to their mutual advantage and that of the patients and students.

DR. IDRIS MORGAN said that he was disappointed that Dr. Poate had not referred to the necessity for after treatment. He referred to the question of diathesis and spoke of the underlying process which Dr. Walker had described. He was convinced that the process that caused gall stones, persisted after the removal of the stones or even of the gall bladder. It was essential that the treatment should be directed towards the causative process. Operation was only one stage in the treatment. The physician should act as the architect and the surgeon as the carpenter. Many patients were not well after the operation and were obviously in need of instruction in regard to later treatment. He would have liked to have heard some elaboration of the Van den Bergh test. This test appeared to be of value in the diagnosis of portal cirrhosis in its early stages, when due either directly or indirectly to gall bladder infection. He referred to a case in which the diagnosis of diabetes was made. There was polydipsia, polyuria and colic. They had rendered the patient sugar free and had then removed the gall bladder which contained stones. For a period of eighteen months after the operation there had been no necessity to pay strict attention to diet. The diabetic symptoms, however, had returned. A second operation had been undertaken and it had been found that the sphincter of Oddi was contracted. This had been divided and the diabetic symptoms had subsequently disappeared. Dr. Morgan expressed the opinion that after the first operation the inflammatory process had persisted and that the recurrence of symptoms prior to the second operation had resulted from the damming back of the pancreatic secretion as a result of the lesion of the sphincter of Oddi.

DR. P. S. PARKINSON said that in the absence of a senior radiologist he wished to congratulate Dr. Anderson Stuart on his admirable paper and beautiful slides. When cholecystography revealed normal filling and emptying of the gall bladder he held that the findings were not more accurate than, for example, those obtained with a barium enema in examinations of the colon; when the result of the test was positive, pathological conditions were almost always found at operation.

DR. W. B. DIGHT pleaded for the institution of team work in this connexion.

DR. D. KELLY said that he had been interested in diseases of the biliary tract for a number of years. His views had not altered much, but diagnosis had been facilitated by radiography. These advances had been well described by Dr. Anderson Stuart. He would have liked to have heard Dr. Poate discuss the operative treatment in greater detail. He thought that most surgeons adopted the reversed Trendelenburg position. He had had opportunity of seeing this in use during his recent tour of America. He thought that it was a great advance on the old method of placing a sandbag under the patient's back. He thought that it was not always necessary either to drain or remove the gall bladder and spoke of instances in which he had removed the stone without drainage.

DR. F. BROWN CRAIG summed up the discussion and called upon Dr. Poate to reply.

DR. POATE thanked those present for the manner in which they had received his paper. He did not agree with Dr. Stacy that it was necessary to visualize the gall bladder.

He obtained more information by feeling it than by looking at it. In regard to the question of drainage after cholecystectomy, he stated that in clean cases when there was no oozing, they could dispense with drainage, provided all raw surfaces were efficiently over-sewn. It was advisable to apply a double ligature to the cystic duct in the first place. He did not advise surgical treatment for mild conditions, but he begged physicians not to hold their patients until the condition was so far advanced that the prognosis for the operation became bad. He regarded cholecystectomy as the operation of choice, if the local conditions permitted it. When there was trouble in the pancreas, it was advisable to open the common duct and to dilate the duodenal orifice. He advised inspection of the junction of the common and cystic ducts before ligatures were applied. He spoke of the difficulty when the common duct was bound down by adhesions and more particularly of the likelihood of wounding the duct. In regard to myocarditis he had stated that it at times was associated with but not a symptom of gall bladder disease. In reply to Dr. Aspinall he claimed that the paramedian incision led the surgeon directly over the common bile duct. The after treatment when the patient left hospital, should be in the hands of the physician. He always warned his patients that the operation was only one step in the treatment. Unfortunately they were not clear as to why the symptoms arose. He agreed with Dr. Walker that the detoxicating function of the liver was of importance and in this connexion he had seen two cases in which it seemed that it was of hepatic insufficiency after the operation that the patient died. He raised the question whether it was due to fibrosis of the liver tissue as a result of chronic infection. The gall bladder should not be removed for cholangitis if the latter was associated with bile sand. In such cases it was wiser to drain.

DR. WALKER said that he had intended to convey that infection of the biliary tract was an essential part of the process. He agreed with Dr. Smith in deploring the lack of an electrocardiographic apparatus at the University and other teaching institutions and thought that post-graduate teaching should be instituted. In regard to symptoms following cholecystectomy he did not think that blame should be attached to the surgeon. He thought that these symptoms were due to two causes. In the first place some patients were liable to biliary tract infections and in the second place they were not dealt with early enough. The onus for early recognition rested on the physican. If these conditions were diagnosed earlier, there would be fewer unsatisfactory results. He did not think that Dr. Storey would experience great discomfort from the passage of a duodenal tube. After all it was not a large tube, but quite a little one.

NOTICES.

WE have been requested to announce that the scientific programme of the South Australian Branch of the British Medical Association for the ensuing three months is as follows:

September 29, 1927: Clinical meeting at the Adelaide Hospital.
October 27, 1927: "Deformities of the Lower Extremity," by Dr. H. S. Newland, C.B.E., D.S.O.
November 24, 1927: "Sinusitis as a Cause of Respiratory and Alimentary Disorders," by Dr. W. Ray.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Cook, Bertrand Anthony, M.B., Ch.M., 1925 (Univ. Sydney), Young.
Garner, James Verner, M.B., 1926 Univ. Sydney), Sydney.
Voss, Kerrod Bromley, M.B., 1925 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Medical Societies.

OPHTHALMOLOGICAL SOCIETY OF NEW SOUTH WALES.

A MEETING OF THE OPHTHALMOLOGICAL SOCIETY OF NEW SOUTH WALES was held at the Eye Department, Sydney Hospital, on May 5, 1927, DR. R. H. JONES, the President, in the chair.

A Case for Diagnosis.

DR. COHEN'S first patient was a woman, aged forty-four years, who complained of a haziness in the lower part of vision of her right eye for the previous two months. Her vision with correction was $^6/_6$, but objects were blurred in the field immediately below the central point of fixation. The perimeter chart showed a relative scotoma, extending from immediately below the macula downwards for about 50° and extending outward about 45° to 50°. On examination of the fundus the superior temporal arteries appeared slightly smaller than the remainder of the vessels and the surrounding retina slightly paler. In the disc adjoining the superior temporal artery was a small white translucent mass. The response to the Wassermann test was "+++." The question to be decided was the ætiology of this small white body and whether it could be regarded as the cause of a local anæmia of the vessels with which it was lying in contact.

DR. GUY POCKLEY considered that the small white body was a mass causing a partial anæmia to the vessels upon which it impinged.

DR. A. H. RUTHERFORD remarked on the extreme translucency of the small mass.

DR. G. A. BROOKES stated that when the patient was questioned she gave a history of influenza some months previously. He thought that this small mass was some exudate thrown off in an attack of influenza and considered it was in the nature of a clot which had become organized. The disc appeared pale to him and he did not consider that the response to the Wassermann test had much to do with it.

DR. N. MCA. GREGG considered the mass to be a localized thing and not part of a general infection.

Chronic Glaucoma.

Dr. Cohen's second patient was a man, aged forty-one years, who was suffering from chronic glaucoma, right and left, with some unusual features.

The patient had abnormally small corneæ and his history dated back some five years. His right eye had first become affected and he had been under treatment with myotics for some time. Twelve months previously his right eye which was failing rapidly, had been trephined. The notes made at that time were unavailable, but the patient stated that he could see $^6/_{36}$ approximately. Since then the right eye had diverged. Tension was normal and vision was reduced to bare perception of light. The patient had first come under Dr. Cohen's care about one month previously for the left eye. Tension was normal. Vision was $^6/_{12}$ with correction. The pupil was semi-dilated. The anterior chamber was very shallow. There was very deep glaucomatous cupping. The patient had done nothing to his eye for some months. His field was greatly reduced and on the nasal some the scotoma extended to fixation point. The patient complained of having a good day for sight alternating with a very bad day when his vision was very blurred. On application of a myotic the pupil reduced in size and the tension became normal. The patient also stated that for vision outside he was not getting the "blurred" spells so often, but after a few days complained that under eserin he had great difficulty in reading at night. The patient had been told about nine months previously that he would probably lose his sight altogether and he had taken up a course of massage. He stated definitely that he could see better to read when not under the influence of myotics. This was ascribed at the time to the limitation of the field and to the scotoma extending to fixation point. The fundus was seen quite clearly.

Dr. Cohen asked the opinion of the meeting regarding the future treatment and whether an operation was advisable in view of the behaviour of the eye which had been operated on.

DR. E. C. TEMPLE SMITH noted the particularly small cornea and hence considered the condition was evidently congenital. In view of the deep cupping he considered that some operative treatment was imperative. As regards tension he pointed out that tension should be mentioned in degrees of impressibility of the cornea and not by the usual expression in millimetres of mercury.

DR. GUY POCKLEY said that he had seen the patient two years previously. He had then suggested operation on the better eye first. As regards the operated eye, although the tension was normal, he thought there was vitreous present in the trephine hole, judging from the lateral convexity of the bleb and the gelatinous appearance. In regard to the difficulty of reading under myotics, Dr. Pockley thought there was some nuclear sclerosis present. In taking tension he used a formula to express it in degrees of corneal impressibility. For example, Schiotz C.I. = P or no P with 5 weight; Schiotz C.I. = P on 2 with 7·5 weight. He considered that there should be some operative treatment, though he confessed he was doubtful of the final result. In other words it was a condition for a surgeon's dearest enemy to treat.

DR. G. A. BROOKES stated that he had seen this patient about two months previously and had recommended a trephine operation for the left eye.

DR. A. H. RUTHERFORD, DR. N. GREGG and DR. R. H. JONES considered that a trephine operation should be advised.

Degenerative Lesion of the Macular Region.

DR. G. A. BROOKES showed a man whose fundus had the apeparance in and round the macular region of a "basket of eggs in red cotton wool." The vision of the right eye was $^{6}/_{36}$ with a + 0·5 diopter spherical and a + 0·5 cylindrical lens. The patient's serum had not reacted to the Wassermann test. Dr. Brookes raised the question of the site of the lesion and its ætiology.

DR. GUY POCKLEY stated that he had seen this patient about two years previously. Then there had been a few white spots near the macula. The vision had been $^{6}/_{6}$ and was slowly deteriorating. He had last seen the patient four months previously. The condition had then been increasing and the spots had become globular in appearance.

DR. C. G. BERGE quoted a family in England under the care of Mr. Treacher Collins and Mr. Doyne. He considered the condition one of chorioiditis—a degenerative condition not necessarily due to any particular general condition.

DR. R. H. JONES regarded it as degenerative rather than inflammatory and this was the opinion of the members present.

Acute Trachoma.

DR. GUY POCKLEY'S first patient was a Chinese with acute trachoma. He had first been seen at Saint Vincent's Hospital ten days previously with acute trachoma with granulations, pannus *et cetera* and with a perforation of the cornea at the site of the pannus with inclusion of the iris. He considered this case of importance and interest because of the rarity of the combination of pannus and perforation of the cornea.

Detachment of the Chorioid.

Dr. Pockley's second patient was a man who had been struck in the eye with a cricket ball five weeks previously. When first seen he had had an hyphæmia extending half way to the pupil margin. Next day the hyphæmia had disappeared. The fundus had appeared normal. There had been a small area of superficial keratitis below. Vision had been normal. Next morning he had been quite blind with the anterior chamber full of blood. This had since cleared up, but the patient was still blind. He got momentary flashes of vision. Dr. Pockley suggested that a huge detachment of chorioid had occurred.

Leontiasis Ossea.

Dr. Pockley's third patient was suffering from *leontiasis ossea*. The patient when seen had had slight proptosis of the left eye. He had first noticed this about twelve months previously in the Old Country. Dr. Pockley had first seen the patient a short time previously when he stated that it had become more evident lately. Dr. Pockley had sent the patient for an X ray examination and Dr. Sear had diagnosed the condition as one of definite *leontiasis ossea*.

DR. H. R. SEAR who was present by invitation demonstrated the skiagrams of this patient showing the definite osseous lesions and he also demonstrated plates of other patients with a similar condition.

Several members stated that they had not seen a similar case demonstrated and the Chairman, Dr. R. H. Jones, expressed the appreciation of the meeting to Dr. Sear for attending the meeting to exhibit the plates and describe the condition so thoroughly.

Lesion of the Optic Disc.

DR. E. C. TEMPLE SMITH showed a girl, ten years of age, who gave a history of recurring attacks of severe headache with occasional vomiting. The patient had a convergent strabismus. The refraction was + 7 diopters with spherical lens with some astigmatism. The question in regard to the discs was whether the appearance was one of pseudo-neuritis or true papillœdema. The patient had been put on iodides and since taking this drug she had complained of neither headache nor vomiting. The discs were woolly prominent and hazy. He regarded the condition as physiological, but was keeping the patient under close observation.

DR. GUY POCKLEY suggested lumbar puncture if the headaches or vomiting recurred.

DR. N. GREGG and DR. JAMES FLYNN agreed that the condition was probably physiological.

DR. R. H. JONES considered it was pseudo-neuritis, but stated that it was the most marked that he had seen.

Retinal Hæmorrhages with Duodenal Ulcer.

DR. C. G. BERGE showed a woman who gave a history of headache and nausea for the previous four months. She staggered constantly towards the left. Her condition had been diagnosed by a physician as duodenal ulcer. There were about two diopters swelling in each disc. The eye was emmetropic. Hæmorrhages were present near the disc.

Exophthalmos from Graves's Disease.

Dr. Berge's second patient was a man with redness of the eyes. He had exophthalmos of the left eye and slightly of the right eye. He showed the patient for diagnosis between exophthalmic goitre and a local condition.

The general opinion was that it was a condition of exophthalmic goitre aggravating a conjunctival condition.

Optic Atrophy.

Dr. Berge's third patient was a woman with optic atrophy. She had been unable to see for the previous five years and gave a history of "nervous breakdown" six years previously. Vision in the right and left eyes was reduced to counting of fingers. No reaction had been obtained in her serum to the Wassermann test. A neurologist had excluded disseminated sclerosis. An ear, nose and throat surgeon had cleaned out her sphenoids and ethmoids on request and since then vision had improved to $^{3}/_{60}$.

Obscure Lesions of the Fundus Oculi.

DR. JAMES FLYNN showed a child with changes in the fundus. There was a staphylomatous area around the disc, white masses extending into the fundus. He raised the question as to whether the condition was developmental or an early congenital inflammation.

DR. GUY POCKLEY thought that it was a hæmorrhage from a ruptured hyaloid artery giving rise to a condition

resembling *retinitis proliferans*. He quoted a case of recurring leaks from the hyaloid artery in which he had actually seen blood oozing from the stump of the artery.

Congenital Abnormality of the Macula.

DR. N. GREGG showed a child who manifested a peculiar congenital defect of the macula.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the Adelaide University on August 5, 1927.

The Utilization of Nucleic Acid.

PROFESSOR C. S. HICKS communicated some work done by Robertson and Hicks and latterly in conjunction with Marston on the comparison of the utilization of nucleic acids of animal and vegetable origin, confirming some observations previously communicated by Robertson and Hicks and negating others. Their conclusions were that nucleic acids of vegetable and animal origin when administered to a subject subsisting upon an otherwise purine-free diet, are differently absorbed, the latter being slightly better absorbed from the alimentary canal than the former. When the fæcal phosphates form the basis of estimating the differences in absorption between the two the difference was shown to be not very great. On the other hand, the output of uric acid after vegetable nucleic acid was far in excess of that excreted after eating animal nucleic acid. It was inferred that nucleic acid of the vegetable type was decomposed more rapidly or more completely into its constituents than nucleic acid of the animal type.

It was further shown that a demonstrable deficiency of kidney function was produced by the dosage (fifteen grammes *per diem*) of the nucleic acids used. This alteration of renal activity induced retention of various metabolites to such an extent as to vitiate comparisons of output when the two types of nucleic acid were successively administered. Only in the case of uric acid was the excessive production with vegetable nucleic acid seen to overcome the retention attributable to a previous administration of nucleic acid of animal type.

Administration of nucleic acid by mouth led to the appearance in the urine of some substance or substances other than creatinine which reacted with impure picric acid in alkaline solution but did react with picric acid recrystallized from benzine. No leucocytosis either total or relative was induced by the oral administration of either form of nucleic acid. The effect of yeast in inducing leucocytosis was therefore not attributable to its nucleic acid content.

It would seem that on an equal nitrogen intake meat was preferable to vegetables, if it was desired to reduce the retention of uric acid in the diet.

A second contribution by C. S. Hicks entitled "Metabolism of Man on a Diet Rich in Nucleic Acid," was to the effect that the basal metabolism of the human subject on a purine-free diet with the addition of nucleic acid of plant and animal origin had been studied for a period of twenty-two days and that as a result no significant alteration of basal metabolism could be detected, plant and animal nucleic acids respectively being used.

Professor Hicks also gave a demonstration of the new Zeiss microphotographic attachment for the microscope

Obituary.

JOHN PENNYFATHER RYAN.

AFTER having practised continuously in the town of Gympie, Queensland, for half a century, Dr. John Pennyfather Ryan went to his long rest on July 31, 1927. He was born in the city of Dublin, Ireland, and it was there that he received his early education. In 1866 he became a licentiate of the Royal College of Surgeons of Ireland and in 1870 was granted the diploma of Licentiate of Midwifery of the King and Queen's College of Physicians of Ireland. After doing some hospital work in England he sailed for Australia as medical officer of the ship *Argentine*. This was in 1874. He went at once to Gympie which was to be the scene of his labours till the time of his death. He held the position of Government Medical Officer until he was compelled to give up active work about two years ago. He was also Health Officer to the Town Council and to the Widgee Shire. In the early days he acted as Medical Superintendent to the Gympie Hospital and both here and as medical officer to most of the friendly societies in the district he endeared himself to his patients. His life of continuous service may well serve as an example to others. In his younger days he took a prominent part in the sporting life of the district in which he lived, being interested more particularly in cricket, shooting and billiards. In 1877 he married and last June celebrated his fiftieth wedding anniversary. The sympathy of the medical profession is extended to his widow and five children, two sons and three daughters.

WILLIAM MOORE.

WE regret to announce the death of Dr. William Moore which occurred at Melbourne on September 8, 1927.

Correspondence.

POST-GRADUATE STUDY.

SIR: Your timely leader urging the establishment of organized schemes of post-graduate study under the ægis of the Australian universities should be welcomed by all readers.

Every practitioner recognizes the need for rational treatment based on the discovery of the basic ætiological factors and this in many cases entails much team work. Unless he has long personal experience or the experience of others to guide him, the practitioner may be at a loss to know the proper avenue of investigation or how to evaluate the evidence he obtains from specialists, pathological, radiological or biochemical examinations. Often the multitude of counsellors spells confusion, much expense to the patient and the waning of the latter's confidence in his medical advisers.

Advanced lecture courses and demonstrations will facilitate that constant study which is essential to the maintenance of the prestige of the general practitioner—the backbone of the Australian medical profession. These lectures *et cetera* could easily be arranged between 5 p.m. and 6 p.m., so that all could attend and make success (financial) possible at a small fee with liberal remuneration to the lecturers.

We read of munificent gifts by the Rockefeller Foundation to foster this very study in England. It would seem that with proof of definite schemes of high standard representations made in the right quarter should meet with similar results either from this source or from our own Federal Government.

The granting of advanced degrees or diplomas would enhance the worth of these courses in the eyes of many, but it will be in the mere attendance evidencing the sincere determination of the general practitioner to keep himself abreast of the times that their true value would lie.

Trusting that you will be able to publish this letter so that interest in this vital need may be maintained.

Yours, etc.,

KENNETH SMITH.

156, Smith Street,
Summer Hill, New South Wales,
September 13, 1927.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned has been registered under the provisions of *The Medical Act of* 1925, of Queensland, as a duly qualified medical practitioner:

Parkinson, Henry Hallam, M.B., Ch.M., 1909 (Univ. Sydney), Biloela.

Restoration to Register:

Wilson, Victor Roy, M.B., 1920 (Univ. Sydney), Brisbane.

Books Received.

SECRETS OF GOOD HEALTH, by Sir W. Arbuthnot Lane, Bart., C.B.; 1927. London: William Heinemann (Medical Books) Limited. Crown 8vo., pp. 152. Price: 3s. 6d. net.

A MANUAL OF GENERAL MEDICINE PRACTICE, by W. Stanley Sykes, M.A., M.B., B.Ch. (Cantab.), D.P.H. (Leeds), M.R.C.S., L.R.C.P.; 1927. London: H. K. Lewis and Company, Limited. Crown 8vo., pp. 228. Price: 7s. 6d. net.

RESEARCHES IN POLYNESIA AND MELANESIA, by Patrick A. Buxton, M.R.C.S., D.T.M. & H., assisted by G. H. E. Hopkins, M.A., F.E.S.; 1927. London: The London School of Hygiene and Tropical Medicine. Crown 4to., pp. 271, with illustrations. Price: 10s. 6d.

Diary for the Month.

SEPT. 28.—Victorian Branch, B.M.A.: Council.
SEPT. 29 and 30.—Federal Committee, B.M.A. in Australia.
SEPT. 29.—South Australian Branch, B.M.A.: Branch.
OCT. 4.—New South Wales Branch, B.M.A.: Council (Quarterly).
OCT. 4.—Tasmanian Branch, B.M.A.: Council.
OCT. 5.—Victorian Branch, B.M.A.: Branch.
OCT. 5.—Western Australian Branch, B.M.A.: Council.
OCT. 6.—South Australian Branch, B.M.A.: Council.
OCT. 7.—Queensland Branch, B.M.A.: Branch.
OCT. 7.—New South Wales Branch, B.M.A.: Delegates of Local Associations Meet Council (First Day).
OCT. 8.—New South Wales Branch, B.M.A.: Delegates of Local Associations Meet Council (Second Day).
OCT. 11.—Tasmanian Branch, B.M.A.: Branch.
OCT. 11.—New South Wales Branch, B.M.A.: Ethics Committee.
OCT. 12.—Central Northern Medical Association, New South Wales.
OCT. 13.—Victorian Branch, B.M.A.: Council.
OCT. 13.—New South Wales Branch, B.M.A.: Clinical Meeting.

Medical Appointments.

Dr. R. Dick (B.M.A.), Dr. W. G. Armstrong (B.M.A.) and Dr. J. S. Purdy (B.M.A.) have been appointed Members of the Advisory Committee for the purposes of the *Pure Food Act*, 1908, New South Wales.

* * * *

Dr. James Joseph Patrick Delaney has been appointed Visiting Medical Officer to the Woorabinda Aboriginal Settlement, Queensland.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xx.

ECHUCA DISTRICT HOSPITAL: Resident Medical Officer.

SAINT VINCENT'S HOSPITAL, MELBOURNE: Medical Vacancies.

VICTORIAN EYE AND EAR HOSPITAL: Medical Superintendent, Resident Surgeons (3).

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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